THE FOUNDRY

for FEBRUARY 1946

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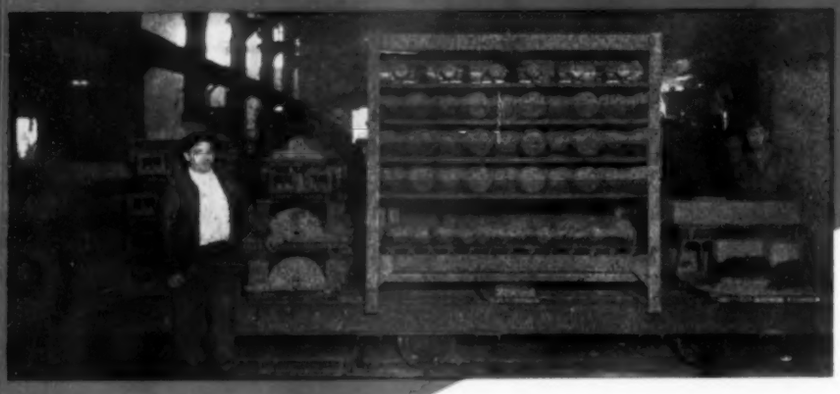
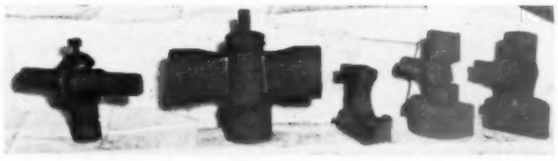
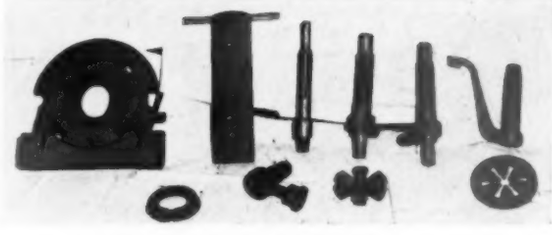


Service

consists of getting the oil without fail when needed, of having expert advice instantly available in case of core trouble, of receiving always core oil that is correct in every minute detail.

"We have used your core oil for years. There have been occasions when unanticipated demands have run our core oil dangerously short. A long distance call to Cleveland, some mighty fast work on your part, and the line has always held. We have not lost an hour's work for lack of oil since you have been serving us. And we never have any core oil trouble," says R. W. Britton, President of Urick Foundry Company, Erie, Penna.





Uniformity of core oil may not be strictly classed as "service," but it is certainly a serious dis-service to ship a foundry anything except uniform oil. Modern and adequate equipment, science, and painstakingly thorough control are all necessary to assure year-by-year uniformity, that uniformity, which in the minds of foundrymen who know, is synonomous with Linoil. However classified, uniformity is a jewel beyond price.

THE WERNER CO.

(DIVISION OF ARCHER-WOODBINE

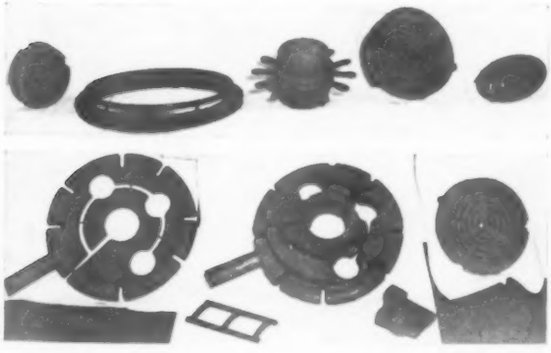
2191 WEST 110 STREET

LIKES SERVICE

Jimmie Iavarone, in front of the truckload of cores, is foreman of the core room. Ed. Fiesinger, standing behind, is foundry superintendent. Both old timers at Urick and both Linoil fans. That's the way it is with Linoil, friends in the counting house, friends in the foundry, friends in the core

LINOIL

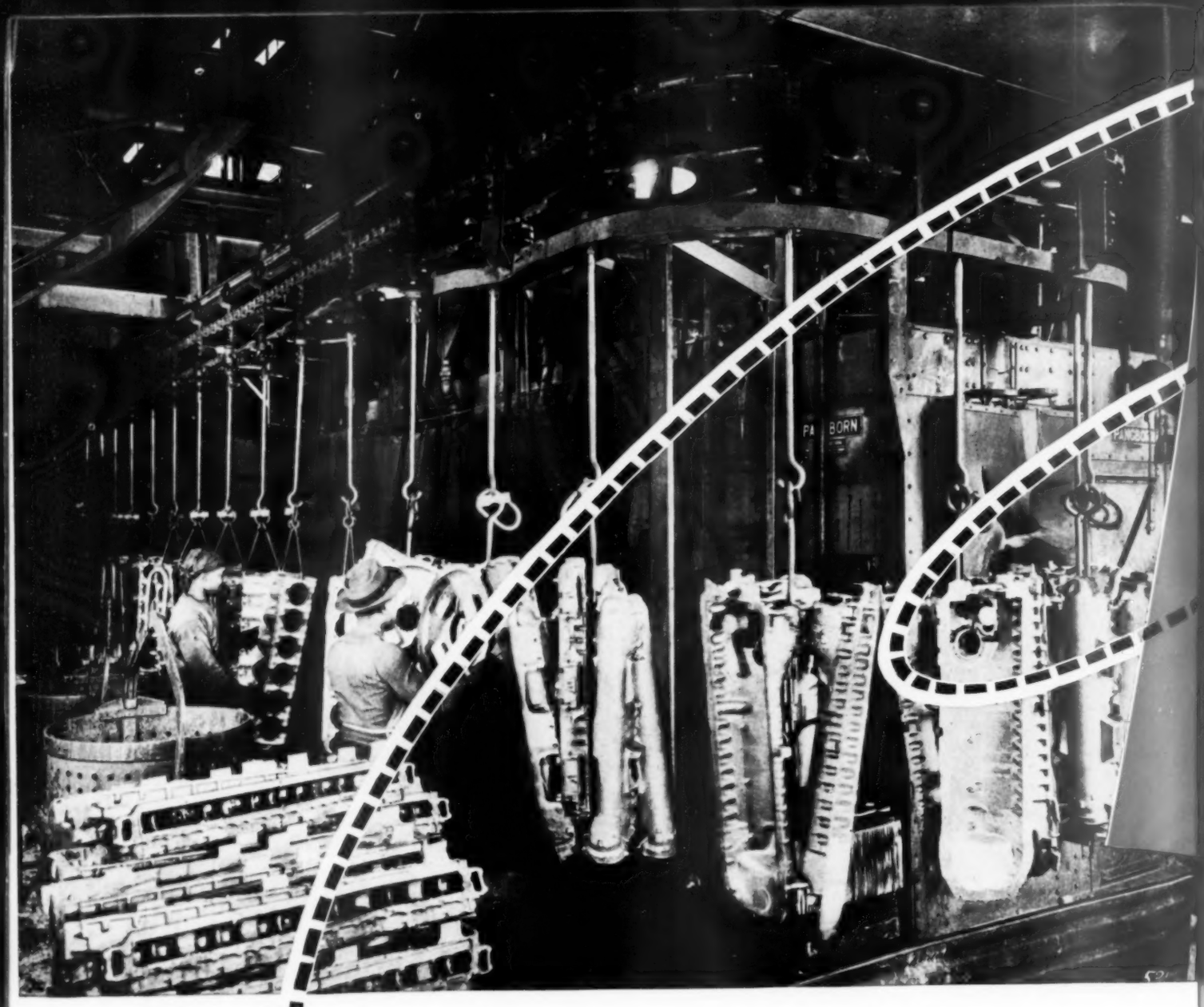
room. They all like Linoil because it does its job in a quiet efficient fashion and never troubles anybody. Management likes the augmented profits that Linoil brings, foundryman likes the sure dependability of Linoil cores, and coreman likes Linoil for the smooth workability of Linoil in all kinds of core boxes and for freedom from complaints and kicks from the foundry. The oven man likes Linoil for its speed and evenness of drying (notice the variety of sizes going in together on the truck), and the cleaning room man is always a rooter for Linoil because of the quick clean knock out. Linoil is a friend to all and a trouble maker to none. Linoil is the logical oil for cores. Use Linoil always.



SMITH COMPANY

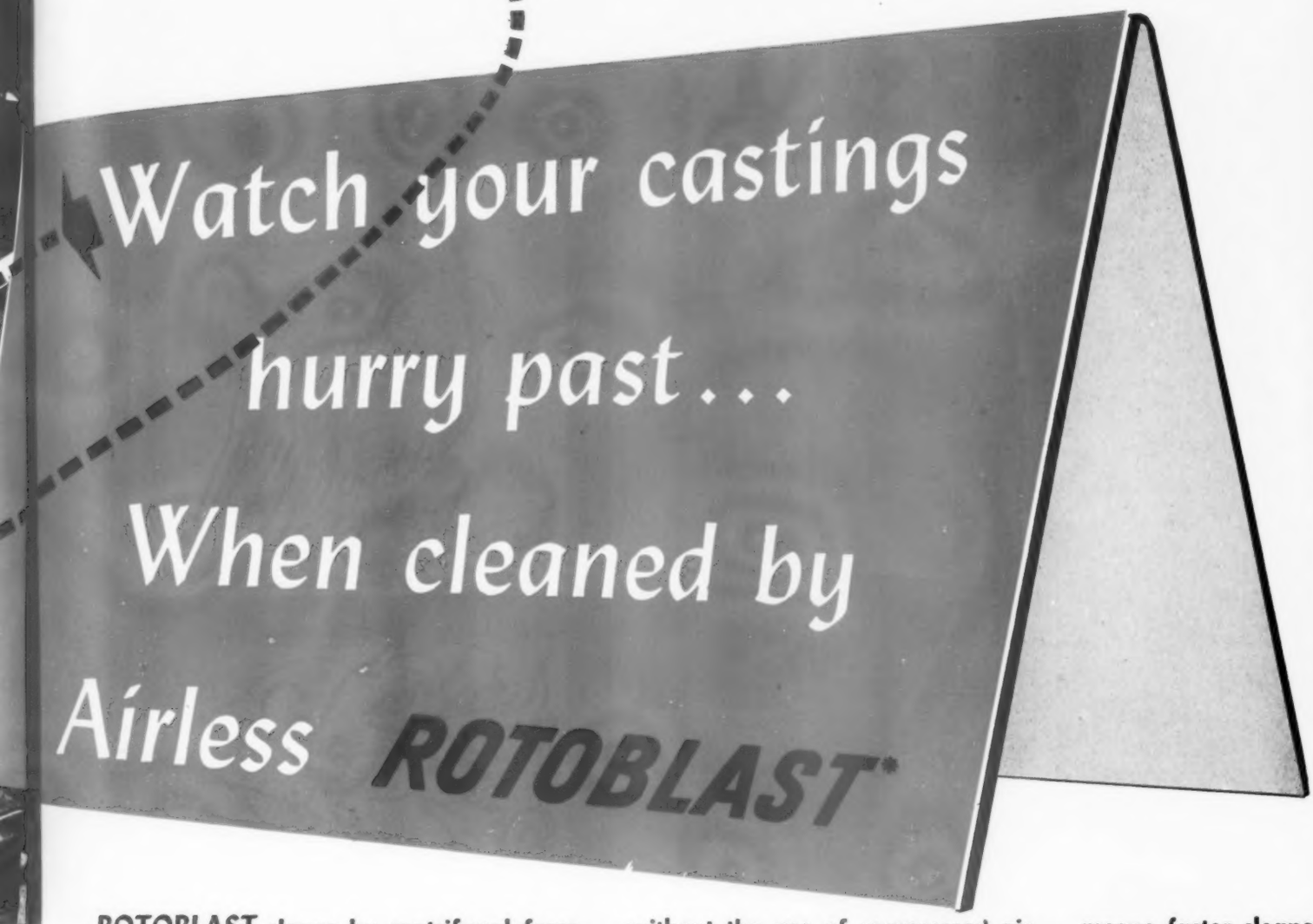
DANIELS - MIDLAND COMPANY)

4690 CLEVELAND 2, OHIO



*TRADEMARK OF THE
PANGBORN CORPORATION

PANG



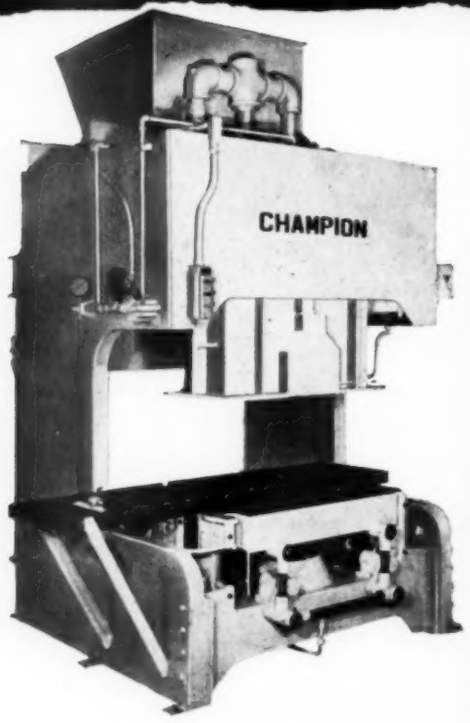
ROTOBLAST cleans by centrifugal force . . . without the use of compressed air . . . means *faster* cleaned castings, forgings, stampings and heat-treated parts. It means *better* cleaned surfaces for *faster*, lower cost machining, grinding and processing. Cost reductions over former cleaning methods are as much as 50% to 90%.

Because Pangborn Special ROTOBLAST Machines (like the one illustrated above which cleans more than 250 blocks an hour) are the answer to faster and cleaner production at lower cost, they are being ordered by forward-looking manufacturers. One of the leading automobile manufacturers recently purchased five additional Special ROTOBLAST Machines to clean cylinder blocks, transmission cases, transmission housings, etc. . . . and a well-known farm implement company just ordered three Special ROTOBLAST machines. Both these companies have just used ROTOBLAST equipment for years.

Let a Pangborn engineer make a survey of *your* cleaning room problems. You profit when you "come to Pangborn".

BORN

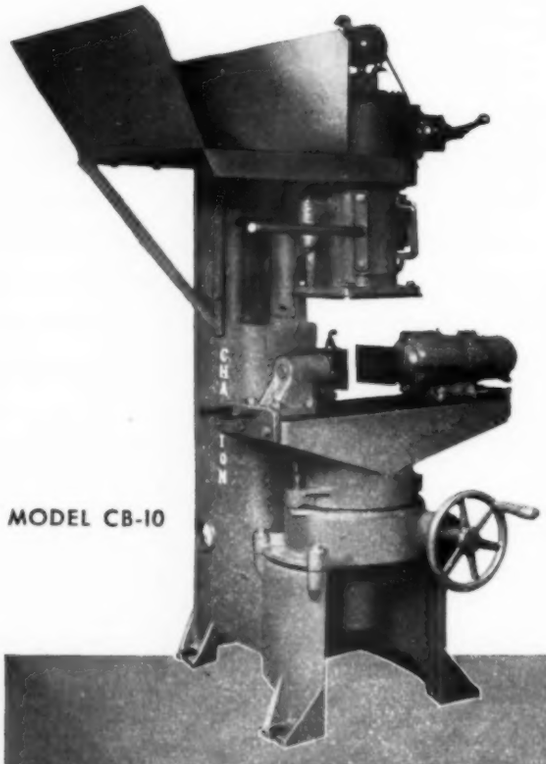
FOUR GREAT



MODEL CB-400

American Eagle

Chinese Dragon



MODEL CB-10

Champions in any endeavour always have that extra bit of something that the sports writer calls "moxie" and the man on the street calls "guts."

That's what the United Nations had and the enemy had not. That's what makes the winner.

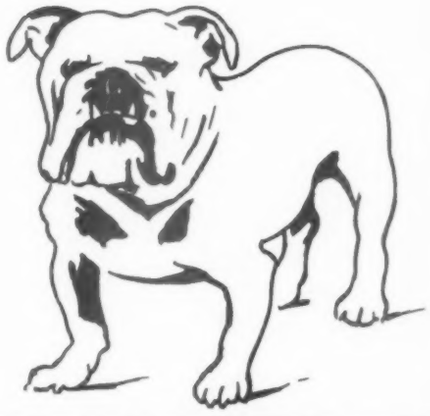
And that's what has made *Champion* Core Blowers great—experience of the designers—built-in stamina and simplicity of operation.

Any man or woman without previous experience can

CHAMPION Foundry

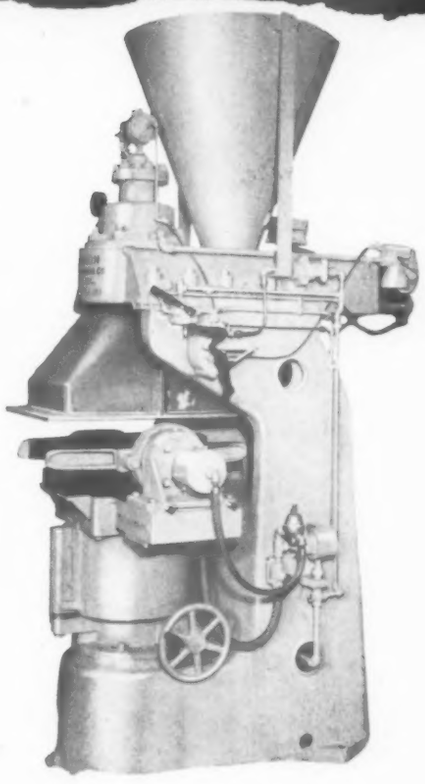
1318 WEST 21st STREET

CHAMPIONS



British Bull Dog

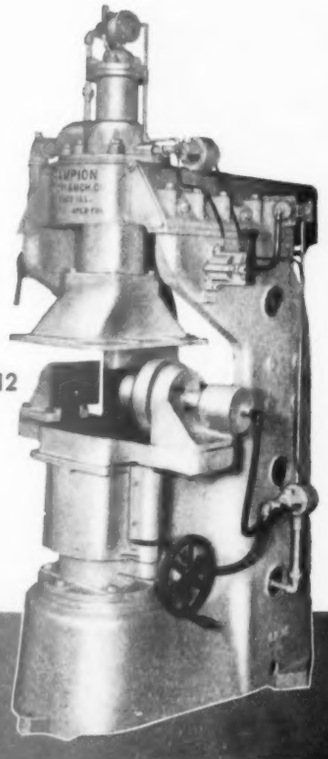
Russian Bear



MODEL CB-15

produce perfectly rammed cores on a *Champion*. You simply set the box and pull the lever. A single valve operates the core box clamp, clamps same against the blow plate, blows the core, exhausts and releases the clamp in the proper cycle. Regardless of size or design—small or large, simple or complex cores—the ramming time is identical.

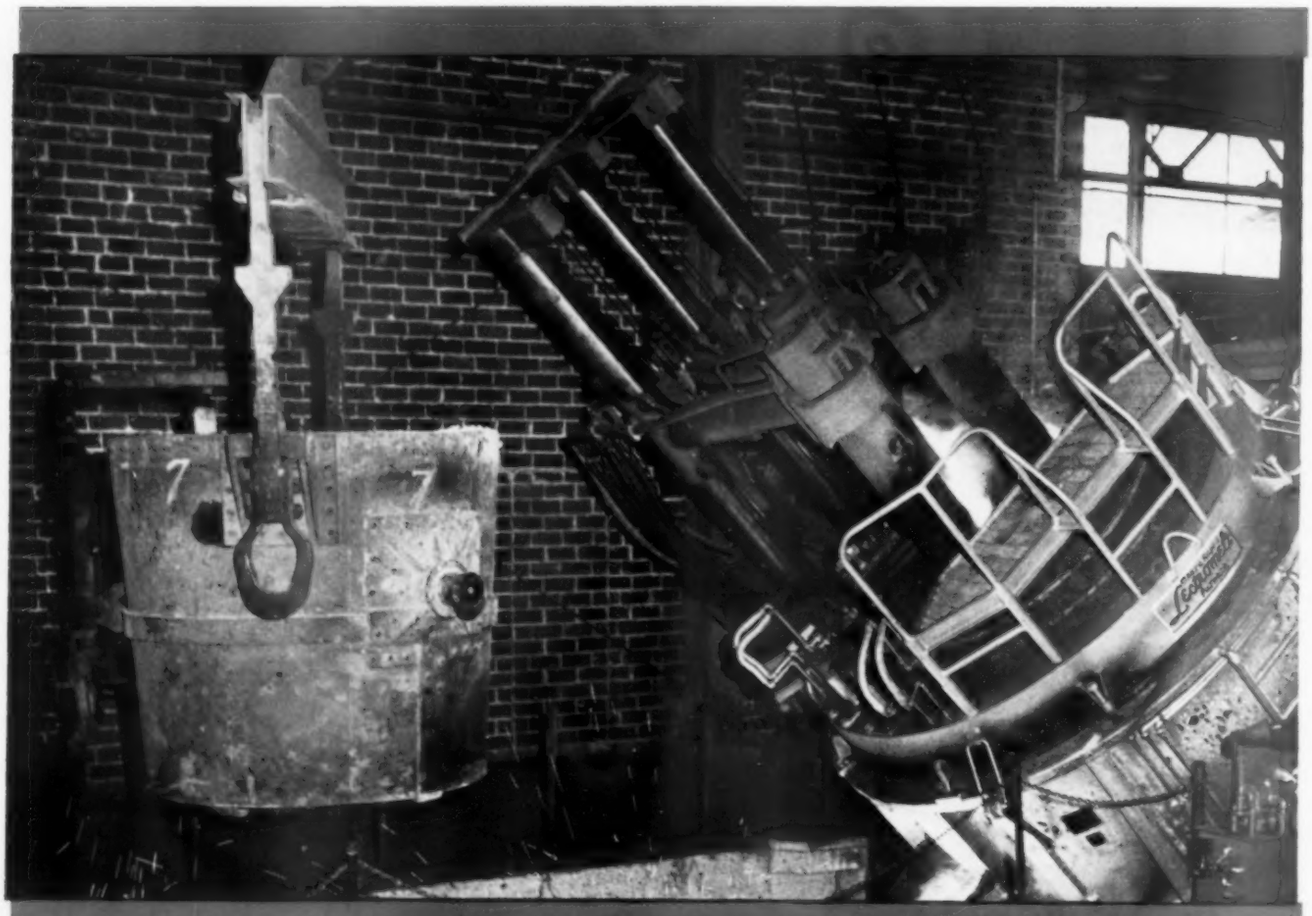
Now that keener competition threatens, why gamble on any core blower other than a *Champion*.



MODEL CB-12

and Machine Company

CHICAGO 8, ILLINOIS

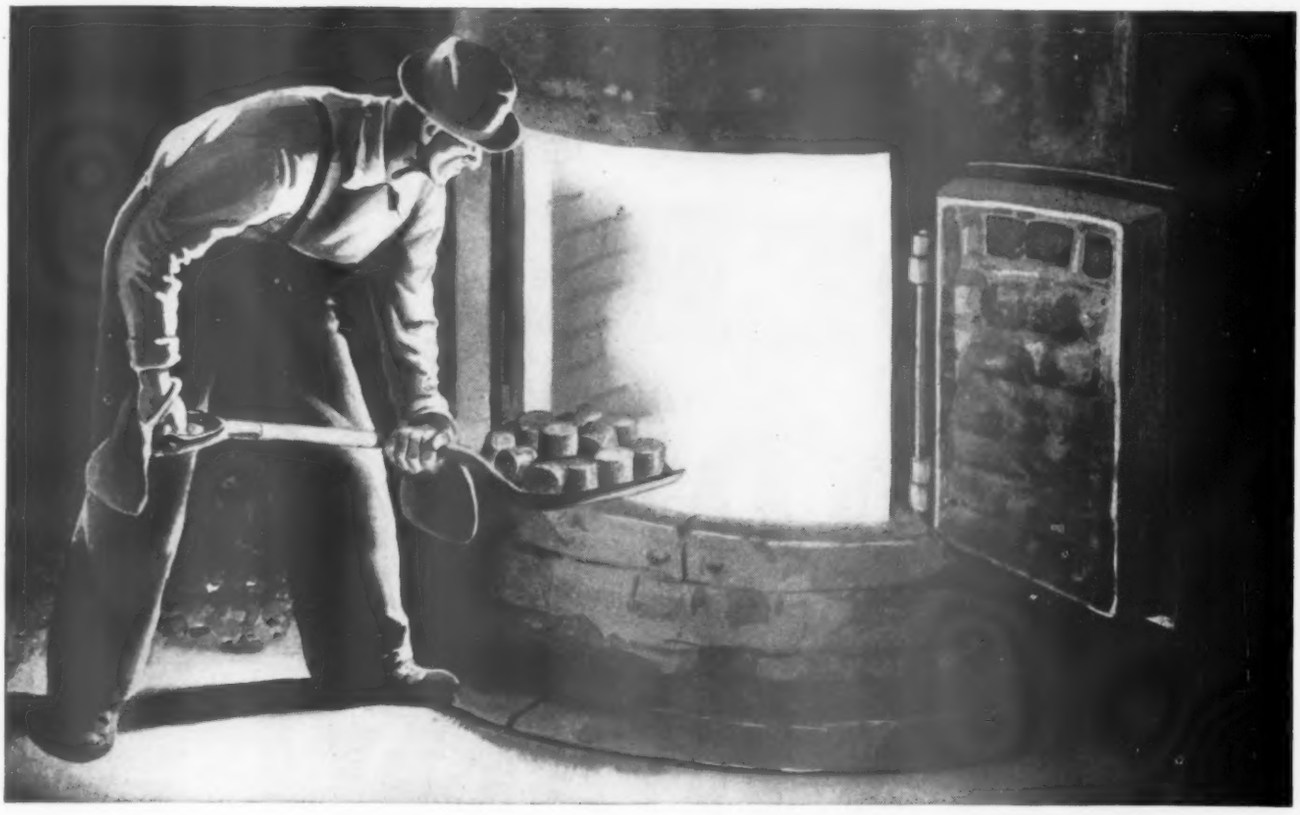


Why THE MOORE RAPID *Lectromelt* IS AN EFFICIENT FURNACE

Well, to begin with, it is a furnace that produces highest quality metals. To achieve that result the operation is easy, economical and continuous. The top charge feature, with use of a drop bottom charging bucket, makes for quick charging with a minimum of man hours and reduced power consumption. The Lectromelt patented counterbalance electrode arm and winch control system reduces electrode consumption. The elimination of complex operating mechanism assures low operation and maintenance costs. To state it simply, Lectromelt Furnaces are built for efficiency—Lectromelt is always on the job. Lectromelt Furnaces of the top charge type are available in capacities ranging from 100 tons to 250 lbs. Write for full details.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH 30, PENNA.

GET THE LATEST INFORMATION ON EM BRIQUETS



THE BRIQUETS with a 13-year service record

For 13 years, progressive foundrymen have used EM briquets for cupola additions of silicon, manganese, and chromium. They have used this accurate and convenient method for adding alloys because EM briquets permit high recovery of the alloying elements; silicon can be recovered up to 90 per cent; manganese up to 85 per cent; and chromium up to 95 per cent.

The reason for this high recovery is the special binder *which will not burn* in passage through the cupola. Thus the alloy is protected all the way to the melting zone, and oxidation losses are kept at a minimum. Write for the booklet, "Briquetted Alloys for the Cast Iron Foundry."

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

"EM" is a registered trade-mark of Electro Metallurgical Company

Nationally-Known Research Institution Reports...

DELTA LIQUID PARTING

"greatly superior to all other types tested"

In many parting applications... where ordinary partings either fail, or are not entirely satisfactory... DELTA LIQUID PARTING is used with consistent and complete satisfaction. That's because DELTA LIQUID PARTING is a product of scientific research. It is "built" to foundry-requirement specifications and made under strict laboratory supervision.

Ask for a sample for test purposes. It's the most economical parting available and... in the opinion of qualified authorities... THE BEST!

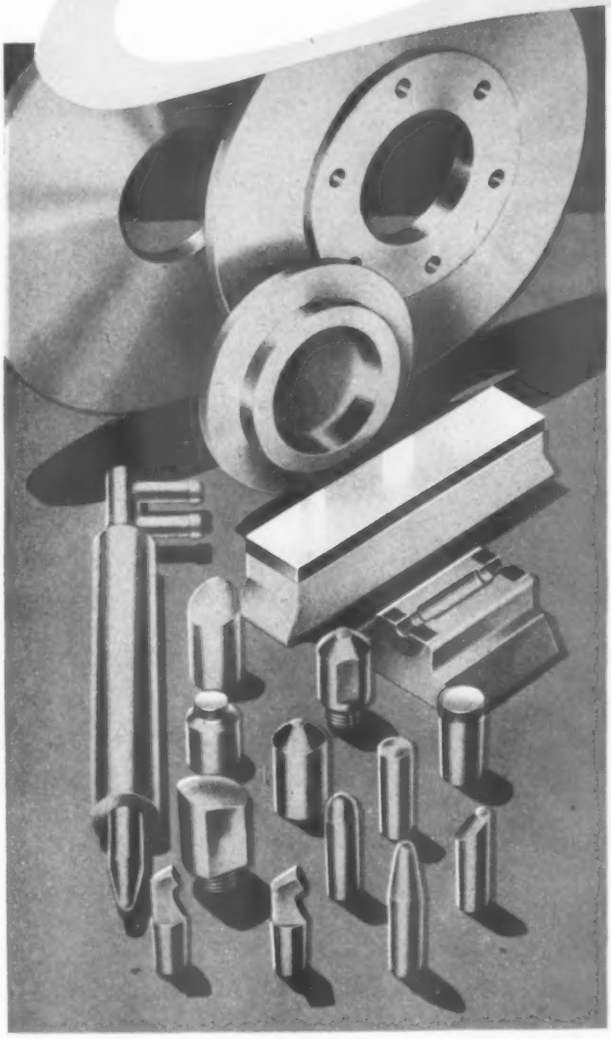
DELTA OIL PRODUCTS CO.

MANUFACTURERS OF FOUNDRY PRODUCTS, INDUSTRIAL AND AUTOMOTIVE OILS, GREASES AND COMPOUNDS

MILWAUKEE 9, WISCONSIN

P. R. MALLORY & CO. Inc.

MALLORY INSURES MELTS!



The addition of Lithium makes it easier for P. R. Mallory & Co., Inc. to meet its high conductivity requirements in these spot welding tips, seam welding wheels, and projection, flash and butt-welding dies. Mallory engineers also use Lithium for thin and complicated castings of Mallory 3, because it improves the fluidity and prevents mis-runs.

It is no accident that Mallory alloys are noted for their uniformly high electrical conductivity and high strength. To *insure* this uniformity, Mallory engineers specify the incorporation of Lithium in their proprietary copper base alloys.

This is sound insurance, because Lithium treated melts of copper, tin bronze and silicon bronze consistently yield castings more uniformly free from porosity and gas cavities, with non-metallic impurities effectively removed, and with optimum physical properties . . . at a small fraction of the cost of *one* reject.

You might naturally expect a treatment so *effective* and *economical* to require a new and special technique. Actually, it is *simple*. Lithium treatment requires no special equipment, no special training, no departure from conventional foundry practice. Shortly before pouring, Lithium metal is stirred into the melt in the form of a stable master alloy containing a small percentage of Lithium combined with other metals to match the melt.

To help you investigate the advantages of Lithium treatment, we offer the services of our technical staff, with more than fifteen years' experience in finding the best practical answers to casting problems. Lithaloys Corporation, 444 Madison Avenue, New York 22, N. Y.

Recognized Authority on LITHIUM

LITHALOYS
REG. U. S. PAT. OFF.

Booth A-714 at the National Metal Exposition

HINES PINS A

WILL NOT RUST OR STICK

NO LUBRICANT REQUIRED

ROUND

HEXAGON

HARDENED...GROUND AND CHROME PLATED

THE HINES

1324 HIRD AVENUE

AND BUSHINGS

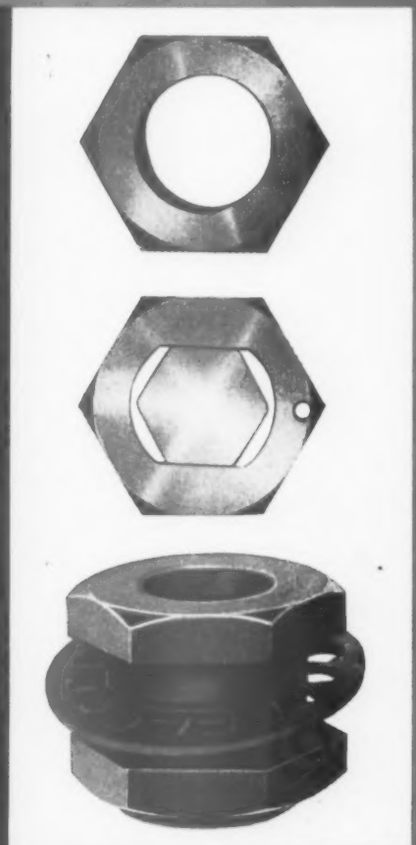
FOR ALL PATTERN PLATES AND FLASKS

Supply your pattern department with Hines Pins and Bushings and you automatically eliminate a great source of their troubles.

THE PINS—Round or Hexagon, hardened, ground and chrome plated. Extremely accurate, will not stick or rust. Made in various sizes with long or short shanks.

THE BUSHINGS—Round or oblong, held in place by simple lock washer and jam nut. Easy to install or replace. Note broad wearing surface of these hardened bushings in illustration at right. Made in two lengths—short for flasks and pattern plates up to ½" thick, and long for pattern plates ½" to 1" thick.

Write for Complete Details and Prices



TOOLS FOR INSTALLATION

This counterboring tool and wrenches are the only tools needed for any installation of Hines Pins and Bushings.

FLASK CO.

CLEVELAND 7, OHIO

BIRTHPLACE
of modern core binders

Here is where core oils are born and raised until they are ready to be graduated from the "lab" into foundries for practical test. Pictured below is a section of our modern foundry laboratory, equipped with all the latest devices for testing cores.

Here you'll find standard test ovens, dilatometer, hardness tester, compression strength machine, rammer, muller—everything needed to be sure that new developments in Hy-Ten Core Oils will be in line with foundry needs.

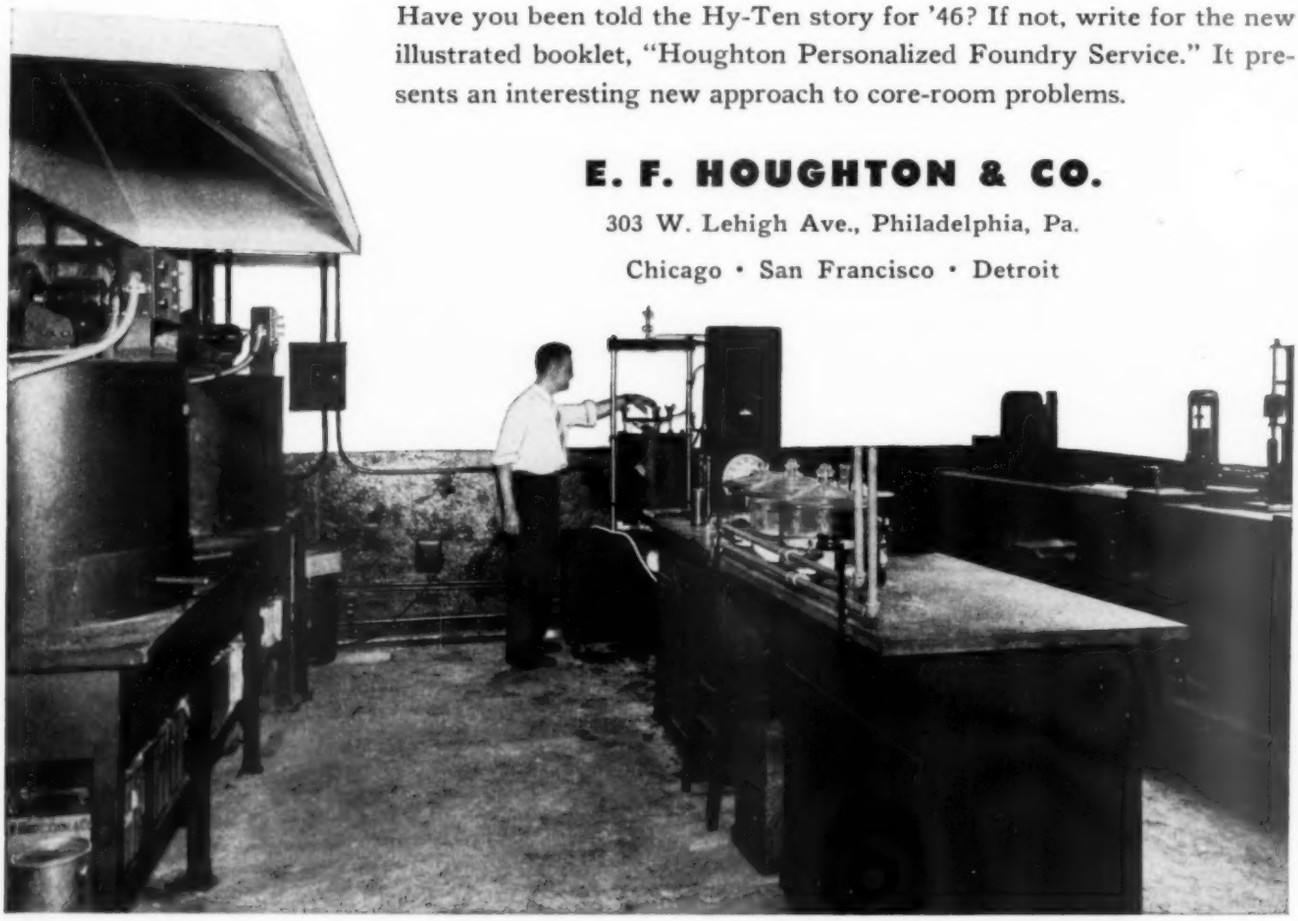
It was here that the Hy-Ten 10-70 series of "polythermic" core oils was originated—a range of oil binders to suit every purse and every pouring.

Have you been told the Hy-Ten story for '46? If not, write for the new illustrated booklet, "Houghton Personalized Foundry Service." It presents an interesting new approach to core-room problems.

E. F. HOUGHTON & CO.

303 W. Lehigh Ave., Philadelphia, Pa.

Chicago • San Francisco • Detroit

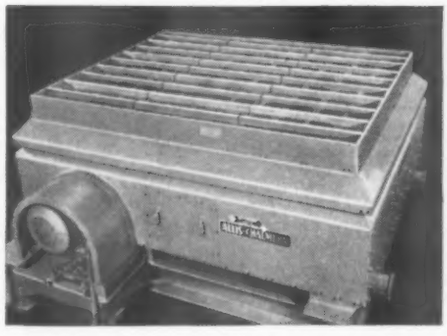


HOUGHTON'S HY-TEN CORE BINDERS

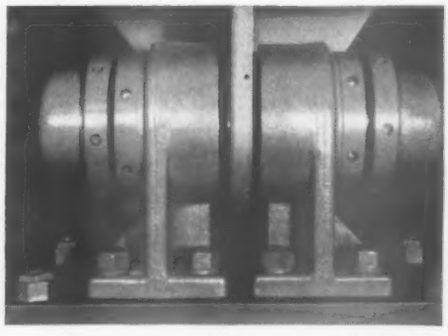
NEW "FOUNDROMATIC" SHAKEOUT HANDLES 90% FOUNDRY OUTPUT

Old way—took 20 minutes with compressed air vibrator, extra man-hours on this 8 ton mold.

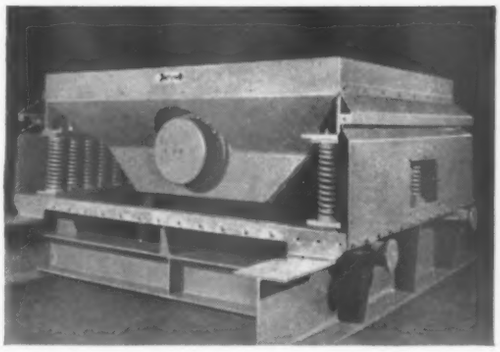
New way—Here, a 13½ ton mold is freed in 1 minute, 45 seconds on the modern, high-speed "Foundromatic" shakeout!



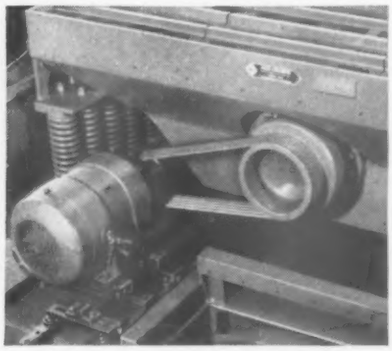
Here's all-welded, stress-relieved deck—built to withstand 24-hour-a-day abuse!



These snubbers stabilize shakeout — assure smoother operation starting and stopping.



20 resilient support springs easily carry weight of shakeout plus entire weight of mold.



Special pivoted type motor base maintains uniform tension on belts.

First Pictures of 25 Ton Capacity, Single Unit Shakeout Reveal Features, Construction Which Promise Important Foundry Benefits

MILWAUKEE, WIS.—A new shakeout has been designed to handle 90% of tonnage cast in average jobbing foundries — where molds daily range anywhere from 500 to 50,000 pounds each. Called the "Foundromatic" shakeout, this new 8 x 10 foot, 2-bearing unit is supplanting smaller, conventional 4-bearing shakeouts for heavy duty applications and wide weight-range operations.

Companion sizes—6 x 8 ft, 18 ton; 5 x 8 ft, 12 ton; 5 x 8 ft, 7½ ton; and 4 x 6 ft, 6 ton capacity units—are available.

Single units, the new shakeouts eliminate need for using multiple, smaller, 4-bearing units to get big capacity. In addition, they're *lower* in initial and operating cost; require *less* maintenance; *save* valuable floor space.

For complete details, contact our nearby district office, or write for Bulletin B6365. ALLIS-CHALMERS, MILWAUKEE.

A1965

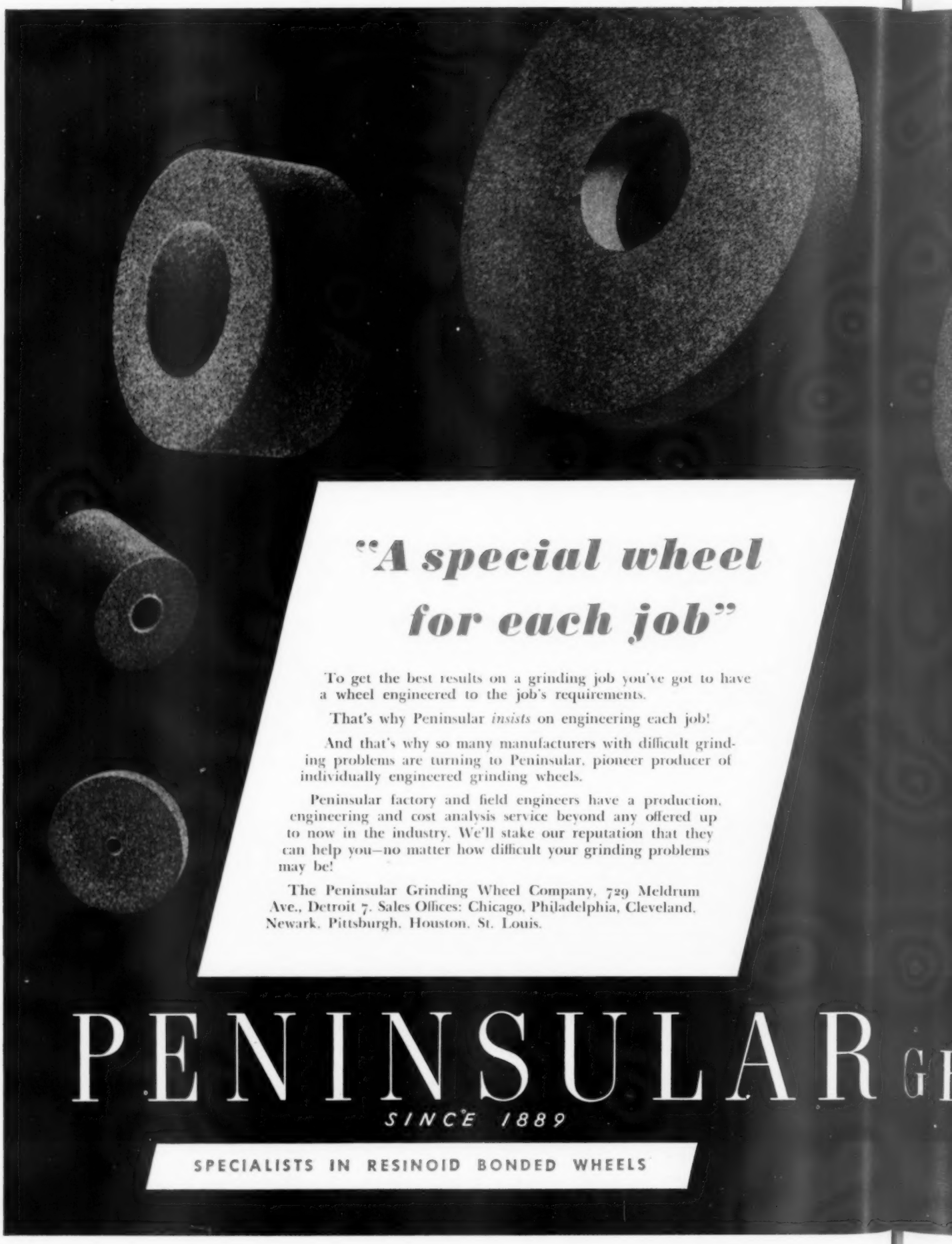
Get Extra Melts Per Day With "Regulex" Control

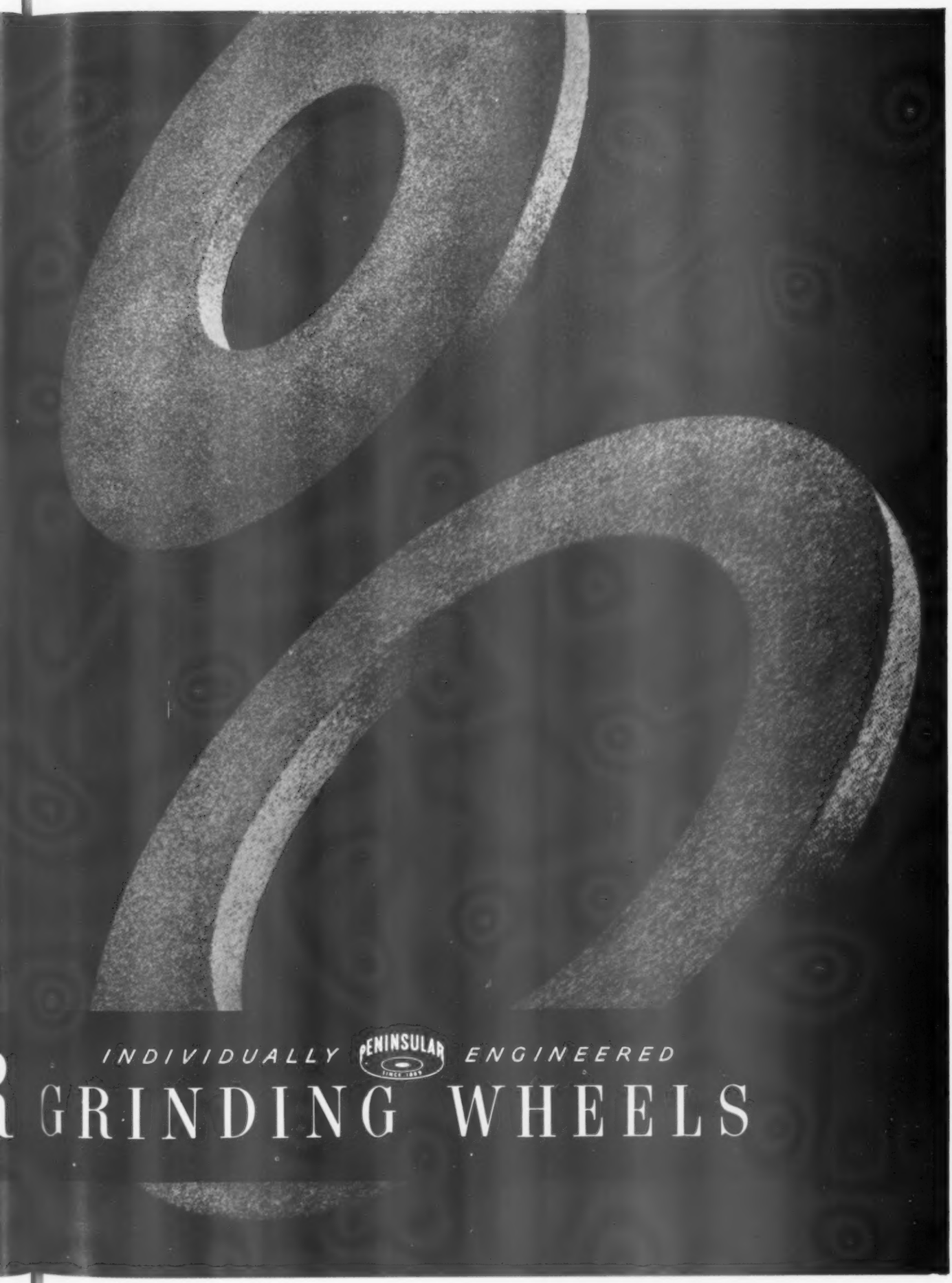
Extra melts per day—at lower cost—are possible when arc furnaces are served by A-C complete substations. Largely responsible for gains is "Regulex" electrode control.

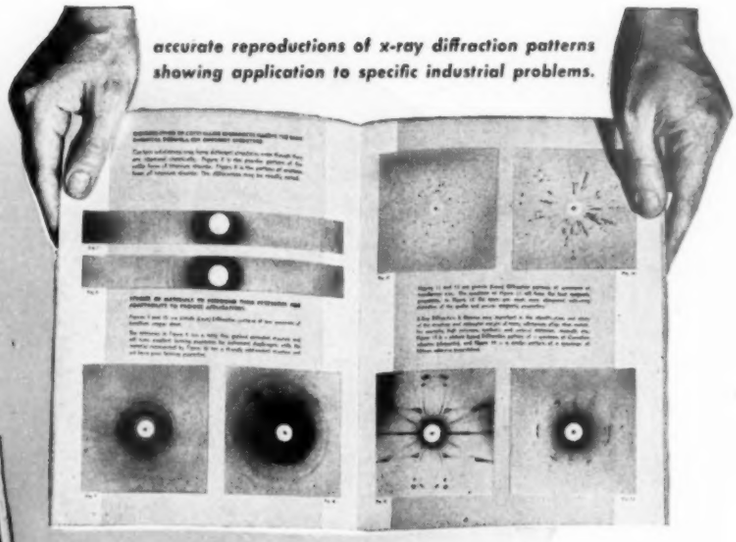
This kind of help is typical of A-C equipment for the foundry industry — Screens, Crushers, Hearth Furnaces, Kilns, Motors, Starters, Texrope Drives, Pumps, Blowers, Compressors, Transformers, etc.

ALLIS-CHALMERS — *EQUIPMENT FOR THE FOUNDRY INDUSTRY*

HEAR THE BOSTON SYMPHONY: *Every Saturday Evening, American Broadcasting Co.*


"A special wheel for each job"
To get the best results on a grinding job you've got to have a wheel engineered to the job's requirements.
That's why Peninsular *insists* on engineering each job!
And that's why so many manufacturers with difficult grinding problems are turning to Peninsular, pioneer producer of individually engineered grinding wheels.
Peninsular factory and field engineers have a production, engineering and cost analysis service beyond any offered up to now in the industry. We'll stake our reputation that they can help you—no matter how difficult your grinding problems may be!
The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. Sales Offices: Chicago, Philadelphia, Cleveland, Newark, Pittsburgh, Houston, St. Louis.
PENINSULAR
SINCE 1889
SPECIALISTS IN RESINOID BONDED WHEELS


INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS



accurate reproductions of x-ray diffraction patterns showing application to specific industrial problems.

this helpful guide

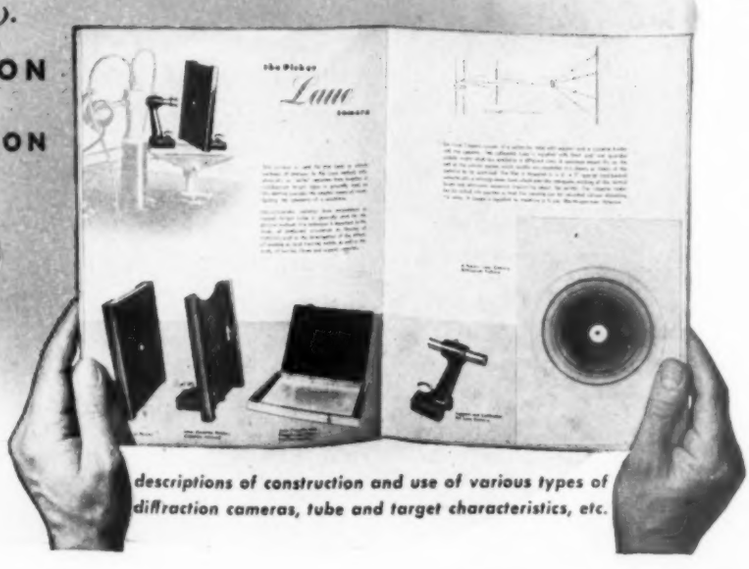
can bring you up-to-date on uses of x-ray diffraction . . .

You've heard of the remarkable contributions x-ray diffraction has made to many urgent wartime problems (in the development of synthetic rubbers, use of steel in shell cases, improvements in plastics, among others). Its applications are so diverse that in many plants today x-ray diffraction has become an indispensable routine tool for rapid physical and chemical determinations, research in product improvement and design, studies in waste reduction. This Picker Bulletin No. 1245, just published, discusses many phases of application, types of apparatus, techniques employed. It will be helpful in the evaluation of the method in your own problems. *Send for it today.*

Picker Bulletin No. 1245 is available without cost or obligation. Simply ask for it (on your letterhead, please, to either of the addresses below).

PICKER X-RAY CORPORATION
300 Fourth Avenue, New York 10, N. Y.

WAITE MANUFACTURING DIVISION
17325 Euclid Avenue, Cleveland 12, Ohio



descriptions of construction and use of various types of diffraction cameras, tube and target characteristics, etc.

AJAX

Salutes

THE MAINTENANCE MEN OF AMERICAN INDUSTRY

Men who keep the wheels of American industry turning have been going through one of the most difficult periods in their experience. They have done their job in spite of help shortage, scarcity of new and replacement parts and many other difficulties which have taxed their ingenuity.

Here at Ajax we get a kick out of knowing that Ajax Flexible Couplings help make their jobs easier. Ajax "reasons why" include,—

Positive resilient hookup between direct-connected machines.

Rubber-bushed, graphited-bronze bearings and interlocking drive studs assure maximum flexibility, quiet operation and complete elimination of lubrication problems.

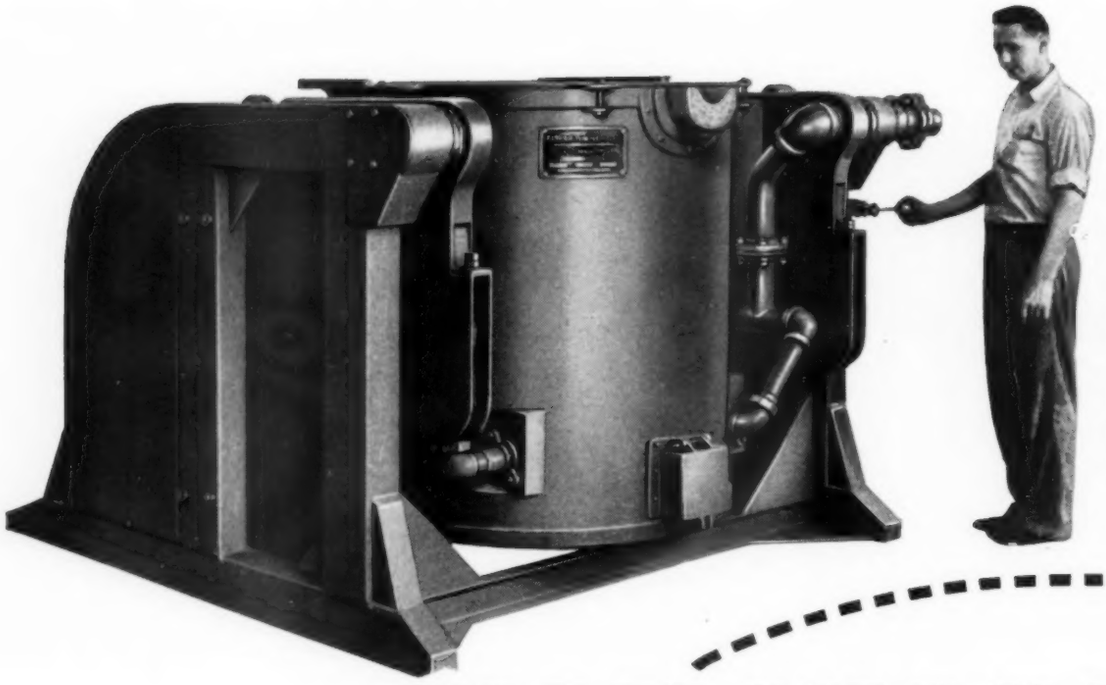
PATENTS MAKE JOBS

Phone your nearest Ajax Flexible Coupling representative or write direct for data book.

AJAX FLEXIBLE COUPLING CO. INC.

WESTFIELD, N. Y.

Incorporated 1920



Fisher hydraulic or electric tilting oil or gas fired furnaces are offered in capacities up to 2000 lbs. magnesium, 3000 lbs. aluminum, 7500 lbs. zinc, and 12000 lbs. lead.

HOT CHARGE

and save time, labor and material

Melting down cold metal at diecasting machines or permanent molds can be wasteful of man hours and machine time. A good holding furnace is not always a good melting furnace.

Modern plant layout calls for a separation of the premelt and remelt operation from the production floor. The use of large tilting furnaces for melting and hot charging centralizes this operation, helps to eliminate lost time at the machine or mold, and improves working conditions by taking melting heat away from the working area.

Fisher nose pouring, motorized tilting crucible or iron pot furnaces eliminate the necessity for ladling, syphoning or pumping zinc, aluminum, magnesium, lead and other metals. These furnaces are ideal for use with a transfer ladle and the metal transfer can be made a one man operation if a monorail is used.

No maneuvering of the transfer ladle during pouring is necessary with the nose pouring feature. The melt down furnace acts as a reservoir for molten metal, making it available for quick demand.

Fisher also makes a complete line of holding furnaces for the diecasting machine or permanent mold.

Submit your requirements. Literature, recommendations, and layout service are available upon request.

5519 N. WOLCOTT AVENUE, CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

Engineers and Manufacturers

EASY GOING!

Thor

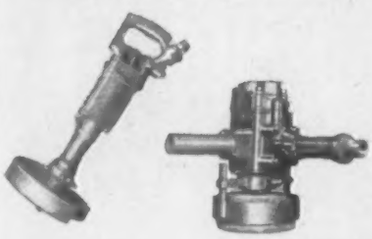
PNEUMATIC GRINDERS AND SANDERS

Remove More Metal . . . Faster

You get steady power and speed plus smooth operation in Thor Pneumatic Grinders and Sanders because advanced design provides positive air control. Thor puts air constantly *behind* the wider blades in Thor's one-piece, dynamically-balanced rotor—to assure instant starting and steady power. A quick-acting automatic governor controls rotor speed at all loads. An "over-size" spindle, ball-bearing mounted, prevents spindle-whip and vibration.

These features mean easier operation and dependable performance that speed grinding jobs. A demonstration will convince you—ask for one now.

TOOL FOR EVERY JOB!



Thor portable pneumatic grinders and sanders are available in sizes and models to take from tiny mounted points up to 8" dia. wheels. All sizes are carefully graduated as to weights, lengths, speeds and capacities. For full specifications, ask for Catalog No. 52B.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles Milwaukee New York Philadelphia
Pittsburgh St. Louis Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

You get *More* <u>*Uniform*</u> cupola melting—at less cost—with ALLEN BILLMYRE TURBO BLOWERS

The variable volumes of air-blast essential to uniform melting of the cupola mixture are assured by the centrifugal type ALLEN BILLMYRE Turbo air-blower . . .

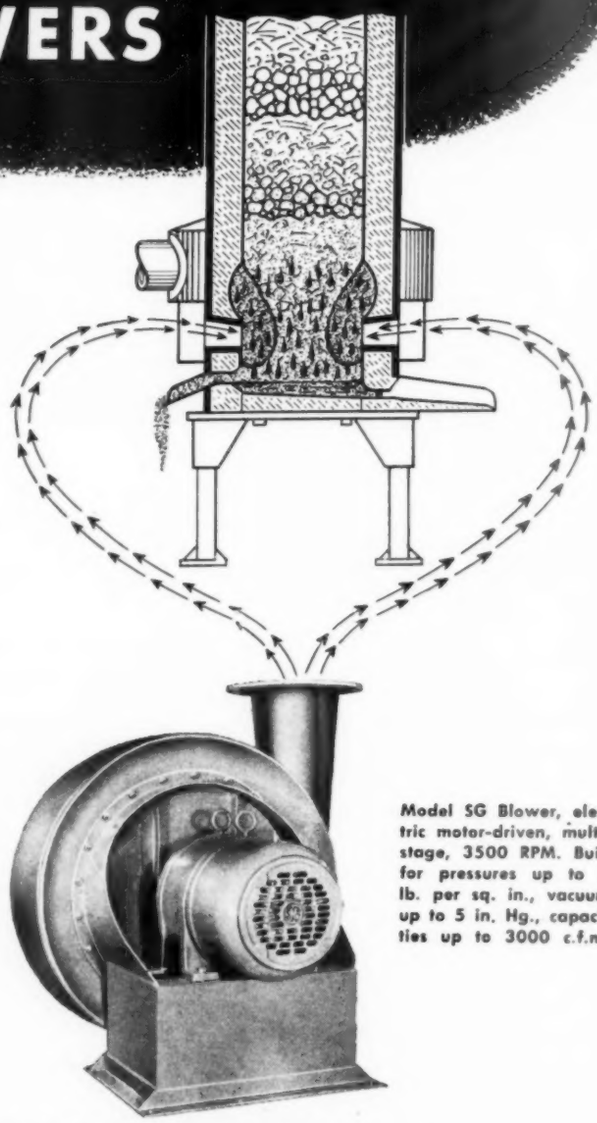
This blower keeps air pressure constant over volume ranges up to 25,000 c.f.m. — *automatically.* And volume adjustment is automatic — to meet the varying air demands of the cupola reaction.

The danger of high blast-pressures burning out the cupola lining is naturally eliminated by a constant-pressure Turbo blower.

And when less volume of air-blast is required — or when the blast-gate is closed — the power-consumption of the self-governing ALLEN BILLMYRE Turbo Blower automatically decreases by a corresponding amount. *This cuts your power costs substantially!*

Here is an air-blower built to maintain its original efficiency indefinitely — without adjustments and with only occasional *outside* lubrication. The ALLEN BILLMYRE Turbo Blower has only one moving part . . . no wearing parts . . . *and uses no internal lubricants!*

Five models and over 500 sizes of ALLEN BILLMYRE Turbo Blowers are described in our new bulletin. This bulletin puts more uniform cupola melting within reach of every foundry — *at less cost! Write for your copy today.*



Model SG Blower, electric motor-driven, multi-stage, 3500 RPM. Built for pressures up to 3 lb. per sq. in., vacuum up to 5 in. Hg., capacities up to 3000 c.f.m.

MANUFACTURED BY

ALLEN BILLMYRE COMPANY

493 Fayette Avenue, Mamaroneck, N. Y.

ALLEN BILLMYRE

BLOWERS AND EXHAUSTERS

AB-820

Saved 5000 MAN HOURS IN 4 MONTHS

A remarkable record — but not unusual for the Hough Payloader, was this performance at the Chicago Hardware Foundry Company, North Chicago, Illinois. Handling moulding and core sand, this speedy little loader maintained peak foundry production and output throughout the critical labor shortage — saved 5000 man hours in four months — cut handling costs substantially — paid for itself in labor savings alone. A record so outstanding that now a second unit has gone into action.

If you are interested in effecting substantial economies, in saving labor, in increasing production, get complete details on the two sizes of Hough Payloaders — Today.

Send for Catalog

Complete information on the HA Payloader—mechanical details, operating data, installation photos, in this new catalog.

THE FRANK G. HOUGH CO.

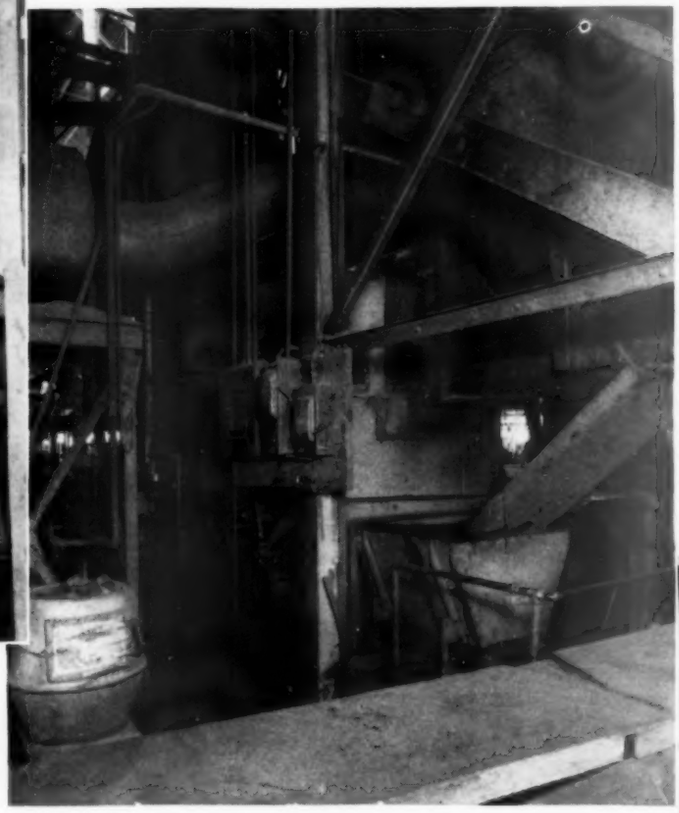
MATERIAL HANDLING EQUIPMENT SINCE 1920

LIBERTYVILLE, ILLINOIS

Simpson Mixer gives ...reports

● Photo above shows the Simpson Mixer in the background; the Timemaster automatic control is shown on the panel to the left. At the right is shown the hopper containing bonding material which is automatically measured into the mixer by means of a vibrating feeder. This mixer is equipped with a National cooling hood insuring delivery of cool, workable sand to the molders. The exhaust duct is shown at the top of the mixer.

● Photo below shows the Simpson Mixer with prepared sand receiving hopper. The feeder belt beneath this hopper delivers the prepared sand at a constant rate to the distributing system. The fan for the cooling hood is shown at the upper left.



● NEW— The new Simpson Molding Cost Calculator shown at the right is a handy tool for foundrymen. With it, one can almost instantly compute the molding cost per ton of good castings, the number of molds to be made to produce a certain number of good castings, how many pounds of iron will be needed to pour off the remaining molds on a floor, and the cubic content of the mold. This Calculator is free to foundrymen. Write for yours.

them 5 important advantages!

Frank Foundries Corporation, Muncie, Indiana

1,2,3,4,5-read em!

1 They now use no facing on the castings, saving the very considerable additional labor of preparing and distributing the facing, and also the extra operation on the part of the molder.

2 The quality of the castings has been improved and the loss reduced because of improved sand condition.

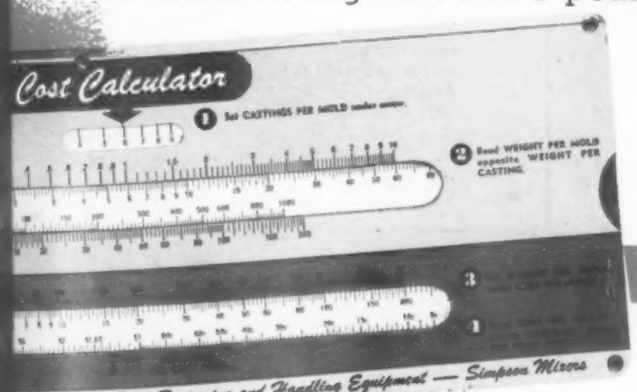
3 Cleaning costs have been reduced very considerably because of the improved quality of the castings.

4 The cost of new sand and bonding material has been cut to a fraction of the former amount because of the ability of the Simpson Mixer to obtain the utmost value of the bonding material. The strength of the sand as it came from the old conditioning unit was 5 pounds G. S. After the same sand, with no addition of bonding material, had been mulled in the Simpson Mixer the strength was 9.4 pounds.

5 Before, molders were always short of sand even though the backing sand was supplemented by facing sand. Now the No. 3 Mixer not only supplies all the sand for the molders on the mechanical molding unit, but also supplies sand for the side-floor molders as well.

●

The No. 3 Simpson Mixer and National Auxiliary Equipment, were installed over a week end so that production was not stopped. The outstanding results from the use of the Simpson Mixer (as listed above) are indicative of the advantages that all types of foundries obtain with Simpson Mixers. Why not have a National Engineer call and tell you how you too can use a Simpson for better, lower cost sand conditioning in your plant.



NATIONAL ENGINEERING COMPANY
MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

"We have had three Sandcutters in operation steadily and have found that they save the labor of twenty-six men."

"With our American Sandcutter, one man in two or three hours can do as much as one man working about four days."

"One machine reduces night force by four men at 71c per hour. $22.72 per day actual savings." (Figure this out for a year.)

"We have had great difficulty in the past in securing labor to cut this sand by hand, and in addition to this the molders prefer the machine cut sand to the hand cut."

SANDCUTTER *cuts more than sand!*

"We are cutting 150 to 200 floors nightly with one operator. This would mean at the present time the work of about 15 men per night, were the cutting done by hand."

Compare the results you can get with a Sandcutter with those obtained by ordinary hand cutting methods . . . you'll find that a Sandcutter cuts more than sand! Check these examples:

1. **COSTS.** Only 15c a heap—including carrying charges, labor, power and maintenance—is the cost of cutting and piling molding sand with a Sandcutter at a prominent agricultural machinery plant.
2. **LABOR.** By installing a Sandcutter, the Dalton Foundries, Inc., Warsaw, Indiana, were able to release 13 men from laborious sandcutting operations. Sixteen men had previously toiled with shovels to cut 64 floors every night.
3. **TIME.** At a Peoria, Illinois, malleable foundry, sandcutting time was reduced 50 hours a night with a Sandcutter. The machine cuts forty floors for this foundry in less than 6 hours.
4. **REJECTS.** Foundries everywhere report a reduction in casting rejects when a Sandcutter is used.

And, of course, there's no comparison between the quality of sand cut with a Sandcutter and sand cut by hand—a Sandcutter does the job so much more perfectly. Investigate the Sandcutter method. Send for more data today.

WRITE FOR COMPLETE CATALOG

The "American Line" catalog illustrates and describes every Sandcutter model as well as all other AFECO products. Send for your free copy today.

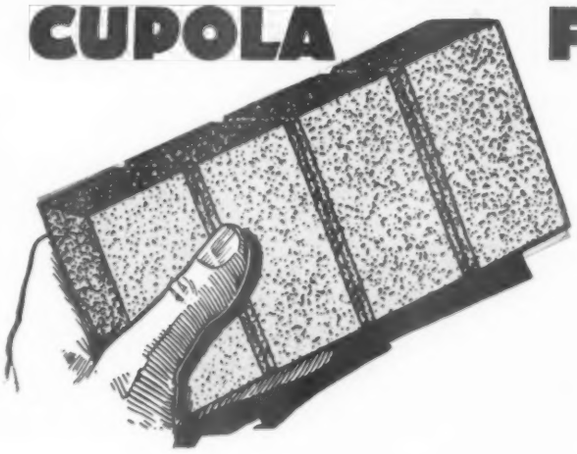
American
FOUNDRY EQUIPMENT CO.
505 S. BYRKIT STREET, MISHAWAKA, INDIANA

Sandcutter

Accurate Measurement in ONE Second!

To get perfect castings there must be no guesswork. You must use the right amount of pig, scrap, coke, limestone, air—and be sure to use the right amount of flux to remove impurities. Famous Cornell Cupola Flux comes to you pre-measured—in exclusive scored brick form. Use an entire brick to each ton or take but a second to break off a briquette (quarter section) for each 500 pound charge of iron in the cupola. The scored brick form not only promotes accurate use of flux but saves time and labor in using and stops waste.

Famous CORNELL CUPOLA FLUX



IMPROVES CASTINGS AMAZINGLY! Iron comes hotter, clean and more fluid, resulting in denser grained, stronger, cleaner and more easily machined castings.

Being in brick form, Famous Cornell Cupola Flux does not blow out with the blast but stays in melting zone until entirely consumed—you get the full benefit of its cleaning efficiency.

Famous Cornell Cupola Flux keeps cupolas clean. Considerably less limestone is needed, consequently there is a definite saving in coke and longer lasting brick in the melting zone.

Write for NEW BULLETIN

The CLEVELAND FLUX Company

1026-1036 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Brass and Aluminum Fluxes, Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

Write for Bulletins

Famous CORNELL ALUMINUM FLUX

Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.

Famous CORNELL BRASS FLUX

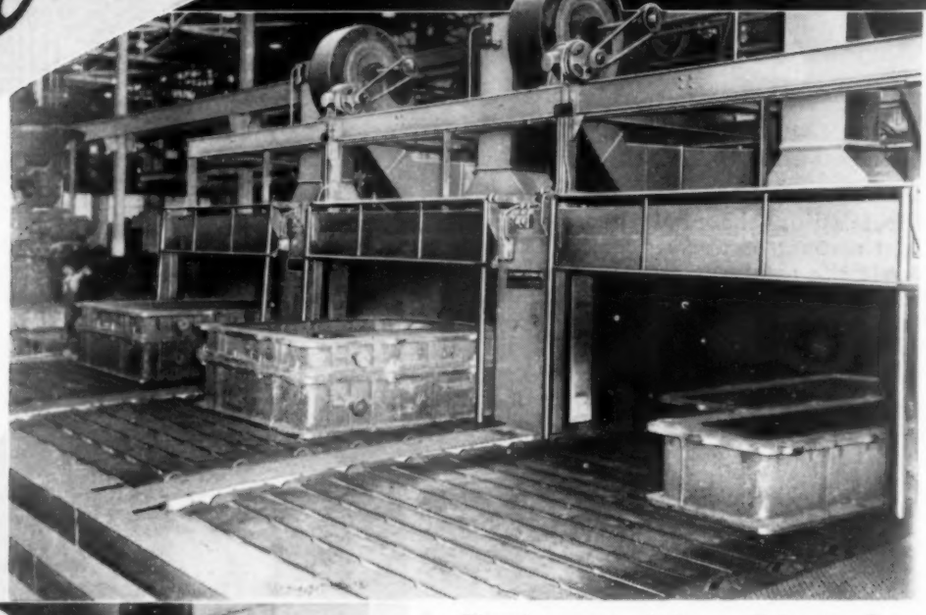
Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.

Famous CORNELL LADLE FLUX

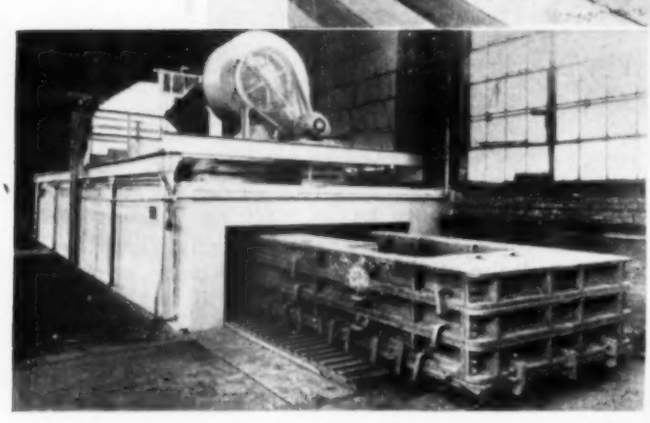
Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

Sweeping Advantages

Coleman



Showing part of eleven Coleman Continuous High-Speed Mold Ovens in large modern machine tool foundry.



Coleman Continuous High-Speed Oven producing outstanding results in mid-west jobbing iron foundry.

Coleman Continuous High-Speed Mold Drying Ovens serving large production steel foundry.

COLEMAN
CORE *and* MOLD
OVENS

The **FOUNDRY**
CLEVELAND

BUILDERS OF COLEMAN

...es In Using

...n CONTINUOUS MOLD OVENS

THE creation of Coleman Continuous Conveyor Mold Drying Ovens has proved an amazing contribution to economical production in medium and heavy shops.

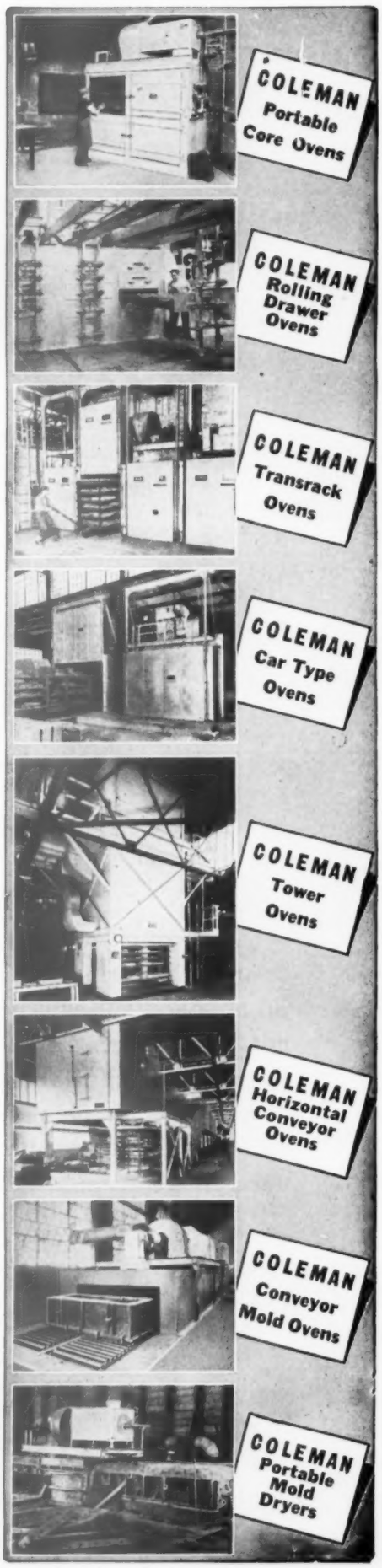
The sensational results produced by these patented ovens have created entirely new conceptions in mold drying speed and dry sand economy in both gray iron and steel foundry operation. The use of Coleman Conveyor Mold Ovens offers the following advantages—

- ***REMOVES ALL RISK OF GREEN SAND MOLDS.***
- ***DOES AN EFFICIENT DRYING JOB THREE TO SIX TIMES FASTER.***
- ***ASSURES STEADY PRODUCTION OF GOOD, SMOOTH FINISH CASTINGS.***
- ***PRODUCES DRY SAND RESULTS AT GREEN SAND CLEANING COST.***
- ***REDUCES FLASK INVESTMENT BECAUSE OF RAPID TURNOVER.***
- ***EFFECTS TREMENDOUS REDUCTIONS IN LABOR AND FUEL COSTS.***
- ***INCREASES FOUNDRY OUTPUT PER UNIT OF FLOOR SPACE.***
- ***IMPROVES WORKING CONDITIONS BY COOLING MOLDS BEFORE LEAVING OVENS.***

Investigate now! Whether your work involves large scale production or the drying of relatively few large or medium size molds, you can depend on Coleman High Speed Mold Ovens to provide amazing economy.

Coleman Ovens are also built in all conventional and special designs to meet every possible requirement in core baking and mold drying. When you buy a Coleman Oven you profit by experience which includes 40 years of *specialization* in designing and building foundry ovens, and more than 8,000 successful installations.

For further information, write for "Folio of Bulletins"

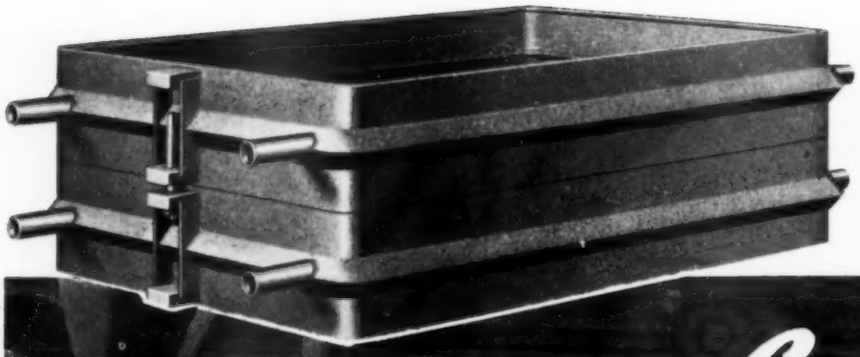


...RY QUIPMENT Company

...D·I HIO, U. S. A.

MEMBER

...MA ND SWARTWOUT OVENS



A *Single Flask*
OR . . .

A Complete Carload!

500 Sterling
STYLE "L" FLASKS
—a complete carload of flasks for a large Western foundry.

Whether your current requirements call for a single flask . . . or an entire carload of flasks . . . your order will have our careful attention and will be shipped as rapidly as conditions permit. Remember, Sterling is backed by more than 35 years of specialized experience building foundry equipment. And Sterling has the plant facilities to turn out practically all types and sizes of foundry flasks . . . and in any quantity. So, if you need flasks, be sure to consult Sterling.

Ask for Sterling's new Catalog No. 56.

Sterling FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 4814-1P-R

These typical Apex ads, appearing month after month, give you the fascinating story of continuing Apex progress in achieving ingot perfection. They chart for you Apex achievement via moden science —with Research Leadership Back of Every Ingot.

APEX SMELTING

Company · Chicago 12, Illinois

HOWARD craftsmen and facilities are available to produce quality wood and metal patterns.

HOWARD craftsmen thoroughly understand foundry practices.

HOWARD patterns are engineered to fit your foundry requirements.

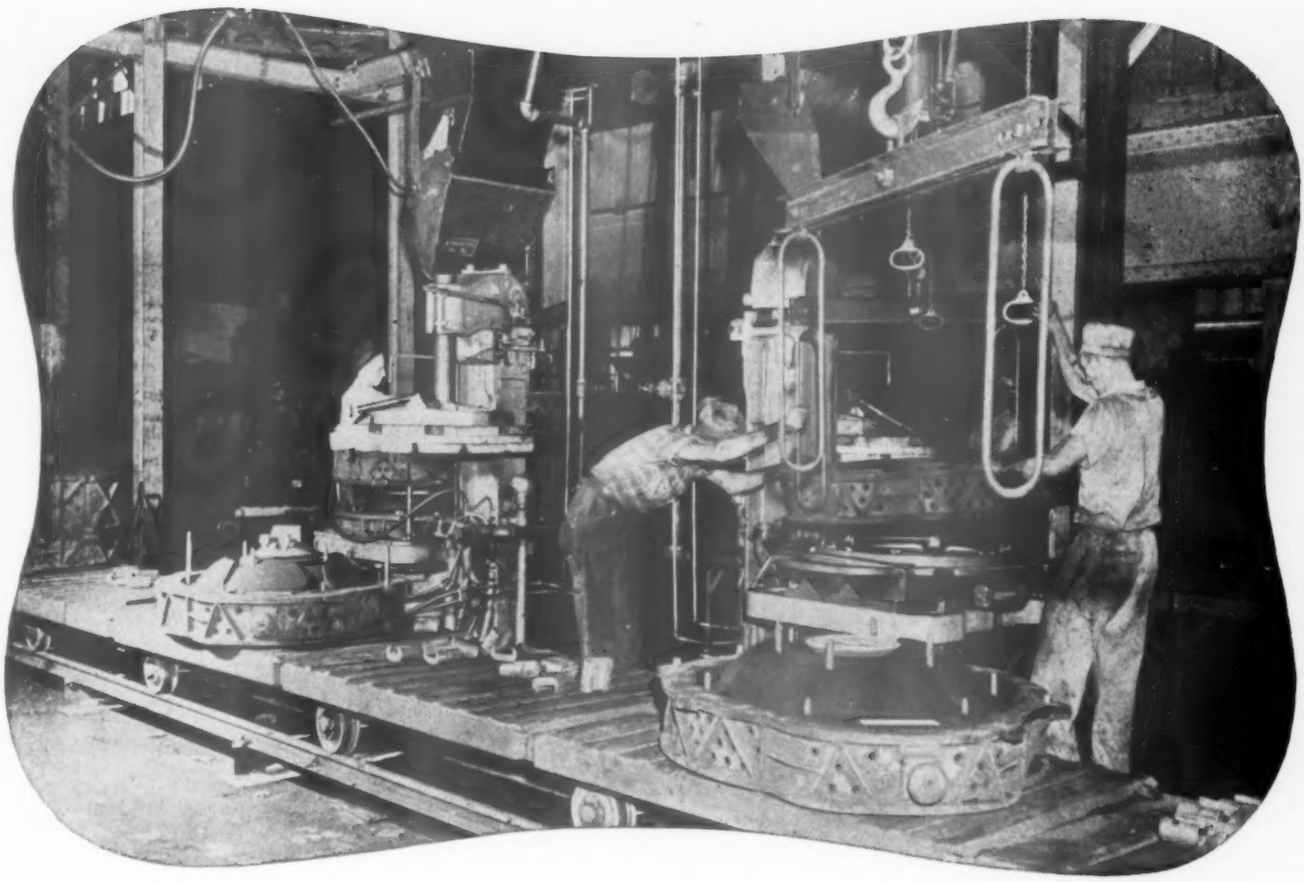
HOWARD modern facilities include two three-spindle type Keller Duplicators which are available for all types of metal duplicating work.

HOWARD FOUNDRY CO.

Pattern Division

General Office 4900 Bloomingdale Ave.

CHICAGO 39, ILLINOIS



Cure for Insomnia . . .

Those sleepless nights, worrying about too high production costs and lost orders can be avoided,— by installing Bartlett-Snow sand, mold and castings handling equipment. Individually engineered to your own particular requirements, Bartlett-Snow equipment enables foundry owners and plant managers to increase both the quality and quantity of their output. Costs go down. Your product finds readier sale. The workmen get larger take home pay—easier—like their jobs better, reducing absenteeism and turnover. And the smoother, more even, more continuous production means bigger profits, larger dividends for you. Can we send you more details?

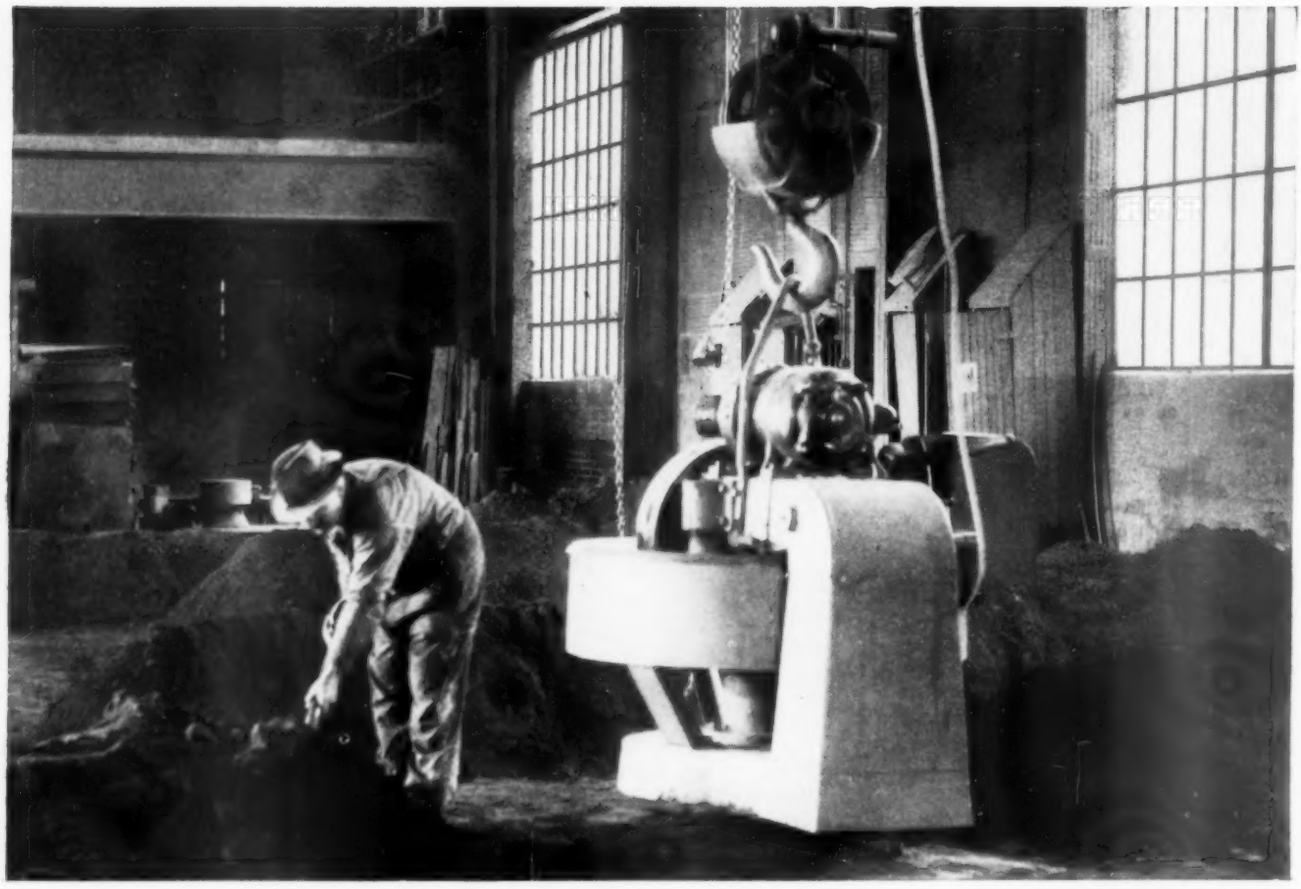
Bulletin No. 91
sent on request

THE C. O. BARTLETT & SNOW CO.

6201 HARVARD AVENUE • CLEVELAND 5, OHIO

ENGINEERING REPRESENTATIVES IN THE PRINCIPAL CITIES

FOUNDRY SAND, MOLD AND CASTINGS HANDLING



The Clearfield 404

—ON THE JOB, WHERE YOU NEED IT.

Portability is of great value in operations where the entire plan of sand preparation is built around the portability of the mixing unit or where it may eliminate the expense of installation and upkeep of conveying equipment. The Clearfield 404 Mixer, in the above picture, is really on the job. Attached to an overhead hoist by means of the integral crane hook this mixer can be taken to the work—power is obtained from nearby line socket by using the extension cord. Since the Clearfield 404 is in perfect balance, and is an all-in-one unit it has complete portability. If preferred the 404 can be mounted on casters.

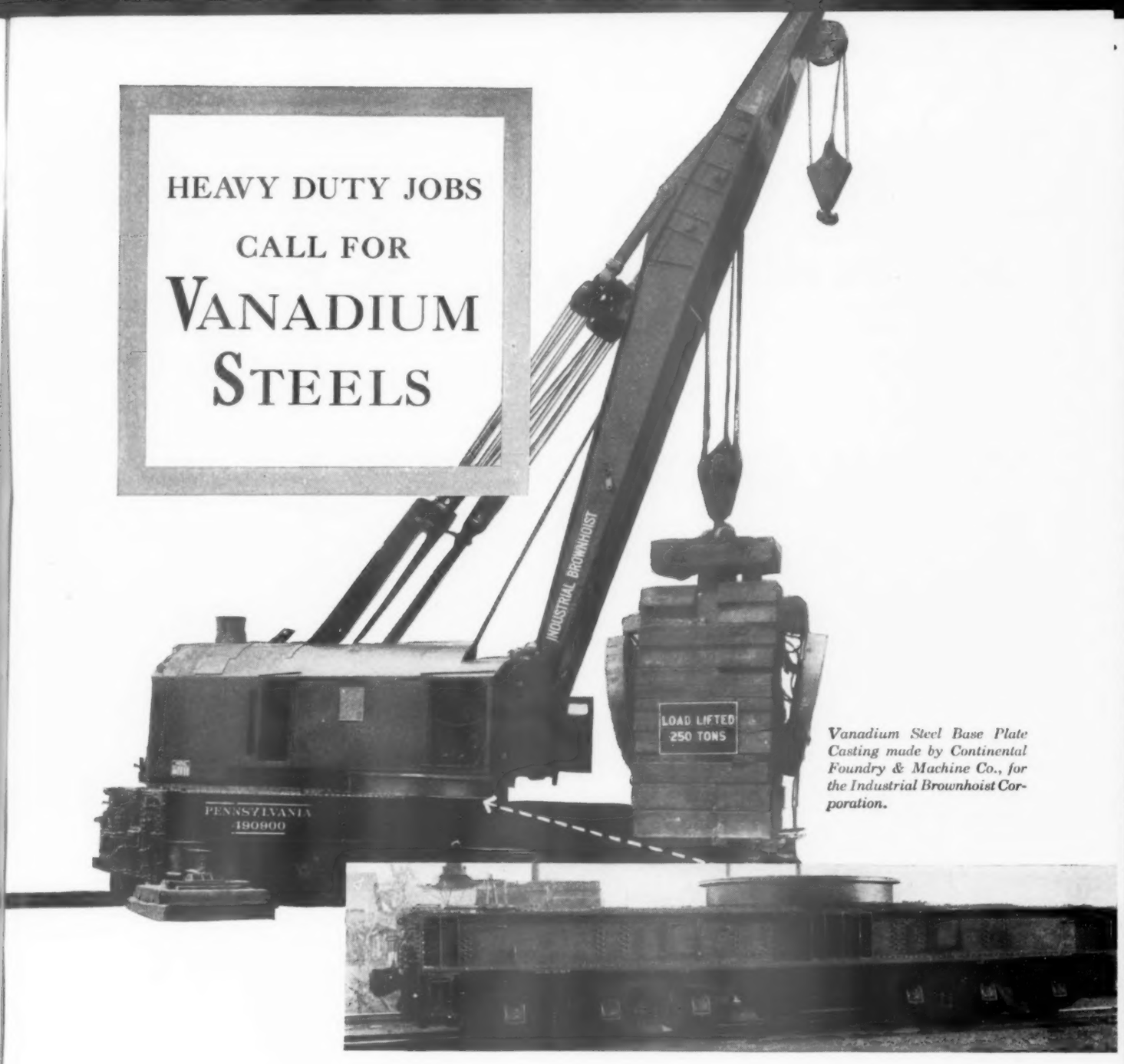
The Clearfield 404 has all of the important Clearfield features including—the Revolving Pan, agitator, two purpose disc and discharge aeration. The Clearfield 404 is one mixer that is always on the job *at* the job.

Write for catalog No. 77 for full information on sand preparation.

CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

HEAVY DUTY JOBS CALL FOR VANADIUM STEELS



Vanadium Steel Base Plate Casting made by Continental Foundry & Machine Co., for the Industrial Brownhoist Corporation.

This behemoth railway crane, designed to lift and shift multi-ton loads, is a typical construction job that calls for the *extra strength* of alloy steels.

That's why the load-carrying, structure-supporting base plate, weighing 25,000 pounds, was cast of Manganese-Molybdenum-Vanadium steel. The analysis and physical properties of this giant casting clearly show the advantages of this Vanadium steel for such applications.

Analysis:

C—0.30% Mn—1.25% Mo—0.22% V—0.12%

Physical Properties:

Yield Strength	55,000 psi min.
Ultimate Strength	85,000 psi min.
Elongation in 2 in.	20.0% min.
Reduction of Area	40.0% min.

Here is another application which demonstrates that *alloy steels can do many jobs better.* They provide extra strength and safety, overall economy in processing, and increased life. Let our metallurgical staff work with you in the application of alloy steels to your special fabricating and construction problems. Their broad experience may provide invaluable assistance

MAKERS OF VANCORAM FERRO ALLOYS AND METALS

"VANADIUM STEEL CASTINGS" is the title of a new technical booklet we have just published on this important subject. A request on your business letterhead will bring you a copy by return mail.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

AO FOUNDRY GOGGLES

SAFETY WITH COMFORT

Put N.F.A. and N.A.S.O. Goggles on your ladlemen so that they can keep their eyes on their work safely, comfortably—steadily.

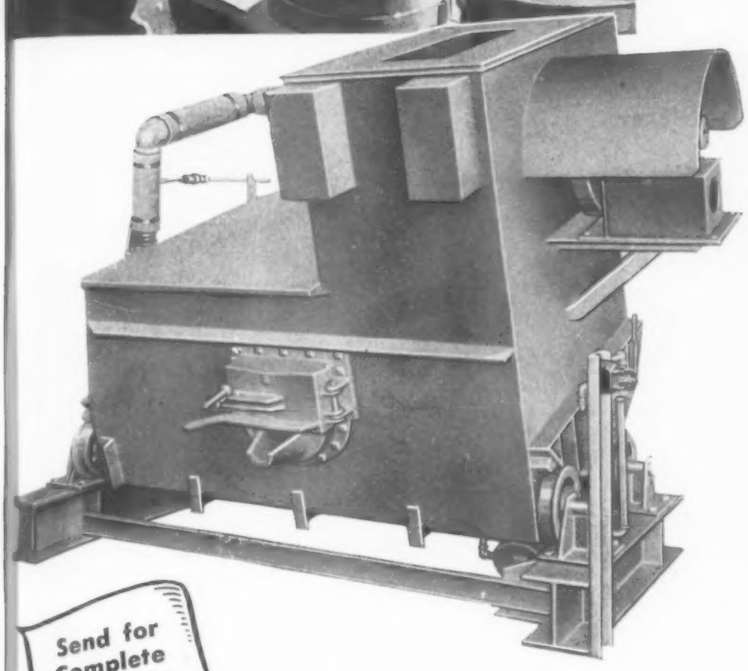
Super Armorplate lenses have high impact resistance—permit the wearer to work without worrying. Snug-fitting, pliable leather mask and wire-screen ventilation around eye-cups afford maximum comfort and coolness—one-piece headband won't slip or catch in hair.

When ordering, specify either clear lenses or lenses made of glare-absorbing Calobar in medium, dark or extra dark shades. 6 curve Super Armorplate clear or Calobar lenses also available. Catalog No. 304 and 305.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

FOUNDRY TESTED FURNACES *For '46*

Here are just three of the many post war furnaces to be presented by Stroman during 1946 to help make the melting of metals easier, faster, better and more economical. Constant experimentation and improvement in furnace design and operation is constantly conducted by Stroman . . . and is guided by the knowledge gained during their sixty-six years of experience in combustion fields. Stroman is the most complete and efficient line of furnaces available . . . there is one built that will do your job of metal melting better . . . and remember, Stroman Engineers are at your service to consult and advise on any foundry layout as well as metal melting problem.



SKLENAR NON-CRUCIBLE, DIRECT FIRED, IMPROVED REVERBERATORY MELTING FURNACE

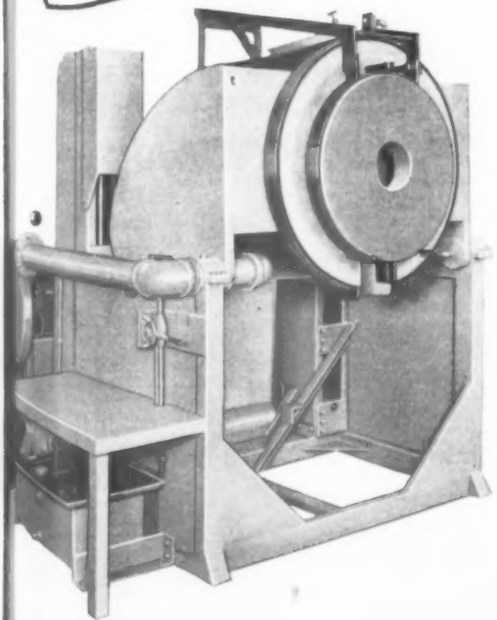
For Melting Special Cast Iron Alloys

Also Brass, Copper, Aluminum, Ferro-Manganese

CAPACITIES FROM 350 TO 10,000 LBS. BRASS

In Sklenar Furnaces metal is charged into a hopper which is also an exhaust from the combustion chamber. Here metal is preheated and melted at the throat of the hopper. Cold metal does not reach the molten bath. Charging is continuous. These furnaces will melt faster and give greatest fuel economy as combustion chamber is heated by the same fuel used to melt metal in the throat of hopper. Mechanical or Hand Tilt. Oil or Gas Fire.

Send for Complete Literature Now



STROMAN CRUCIBLE HYDRAULIC TILT FURNACES

For Brass or Aluminum

These hydraulicly tilted furnaces also embody such features as Stationary Lip Pour, Variable Speed Control, and many other labor saving devices. They are the last word in modern streamline design and efficiency. Push-Back Cover simplifies charging and pouring. Capacities from 150 to 400 crucible.

NEW STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals

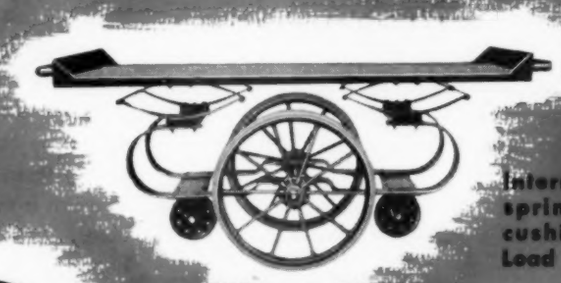
Sturdy, efficient and featuring the Stroman Push-Back Cover, these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 Crucible.

STROMAN FURNACE & ENGINEERING CO.

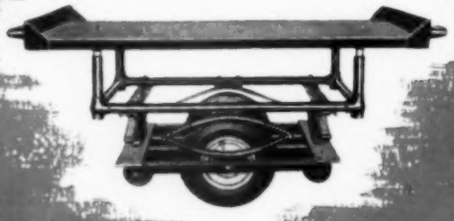
DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6

ACCLAIMED! APPROVED! ACCEPTED!



MODEL B-1
Intermediate elliptical springs provide extra cushioning protection. Load capacity, 700 lbs.

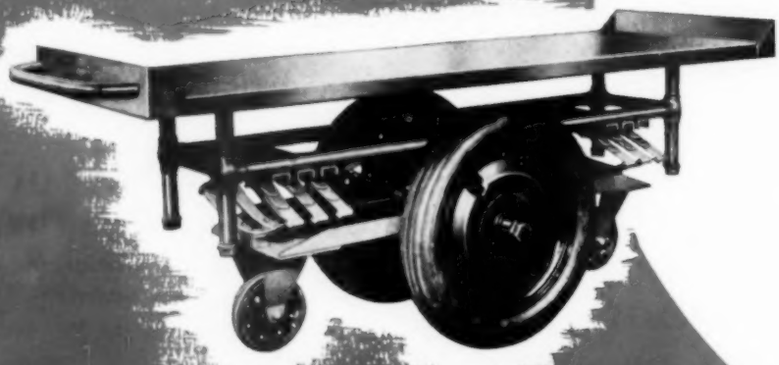


MODEL A-27-J
Elliptical springs and inner coil springs (in the upright supports) assure correct resiliency. Platform, 27″ x 60″. Load capacity, 600 lbs.

CMD

PNEUMATIC CORE TRUCKS

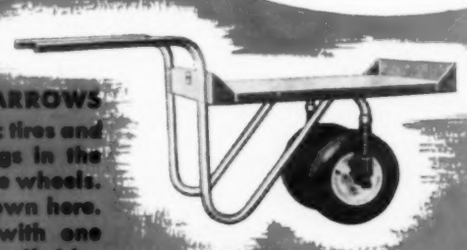
Since 1925 foundries have been using CMD PNEUMATIC CORE TRUCKS to speed up the handling of cores and reduce chafing and breakage. In many places costs have been reduced from 50 to 75 per cent.



Free Circular

Write Dept. 2F today for free circulars on CMD Core Trucks and other foundry specialties.

MODEL A-27
For the heaviest loads, this giant carrier is widely used. Heavy-duty elliptical springs and inner coil springs (in the upright supports) quickly absorb shocks that could chafe or break cores. Three sizes: 27″ x 60″, 900 lbs. capacity; 27″ x 72″—1,000 lbs. capacity; and 27″ x 84″—1,200 lbs. capacity.



CMD CORE BARROWS
Have pneumatic tires and inner coil springs in the uprights over the wheels. MODEL C-2 shown here. MODEL C-1 (with one wheel) also available.

CHICAGO MANUFACTURING AND DISTRIBUTING CO.

1928 WEST 46th STREET (CMD) CHICAGO 9, ILLINOIS

THE GREATEST ADVANCE IN VIBRATORS...

THE VIBROLATOR!

CIRCULAR ACTION PREVENTS DISTORTED "EGG-SHAPED" CASTINGS

OBSOLETES ANY OTHER METHOD

Foundry men are acclaiming the new PETERSON VIBROLATOR because its action duplicates the technique used by skilled molders in rapping a pattern in all directions to free it from sand. The ALL-DIRECTIONAL pulsation of the VIBROLATOR eliminates casting distortion by providing an equal clearance to all of the mold walls.

SMALL, YET POWERFUL

Small in size, light in weight, and noiseless, the VIBROLATOR packs plenty of speed and power. In fact SO MUCH POWER THAT YOU CAN USE THE NEXT SMALLER SIZE THAN YOUR OLD VIBRATOR, WITH BETTER RESULTS.

★

SIZES AVAILABLE

Size	Weight	Price
3/8"	5 oz.	$ 9.50
1/2"	9 oz.	11.75
5/8"	12 oz.	13.50
3/4"	17 oz.	15.00
1"	25 oz.	18.00

Prices are Net F.O.B. Kewanee, Illinois

NOTHING TO GET OUT OF ORDER

Springless, self-lubricating and self starting, the VIBROLATOR is unique in design, and constructed to give years of trouble-free service.

FOR LESS SCRAP AND INCREASED PRODUCTION IN YOUR FOUNDRY CHANGE NOW TO VIBROLATORS

MANUFACTURED BY

MARTIN ENGINEERING CO.

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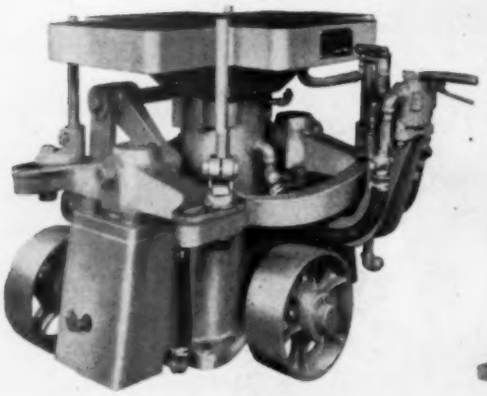
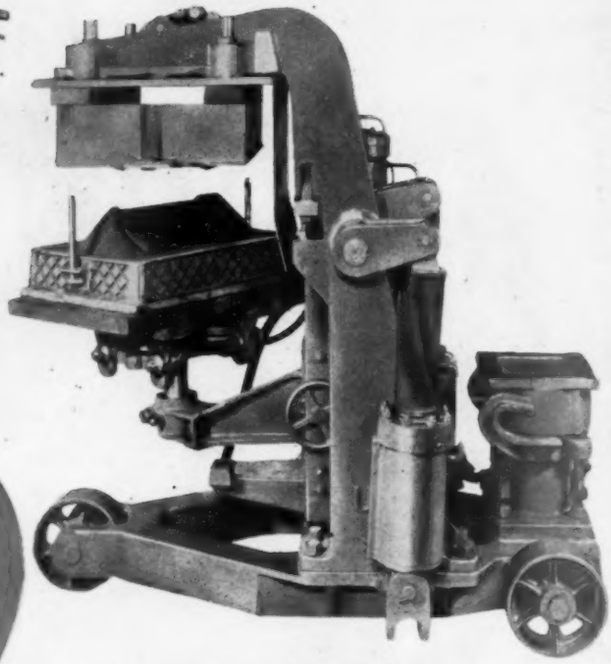


No. 681-C
Portable Jolt Stripper



No. 612 Portable
Jolt Roll-Over Pattern Draw

Pace Setters

● Speed up your production and keep competitive with Johnston & Jennings molding machines. The No. 681-C jolt stripper pictured above—furnished portable or stationary—features a valve-less, shock-less, jolt free from rebound, a positive draw, speed of which is variable to meet different conditions,—and complete enclosure of all working parts, thus assuring years of efficient trouble-free service.

The No. 612 Portable Jolt Roll-Over is designed specially for work requiring absolute accuracy in ramming and drawing. It is ideally used for making the intricate cores and molds required in aircraft and other precision industries. Use of two roll-over cylinders and oil dash pot control assures smooth uniform operation. "J & J" has just the machine you need. Tell us about your job, and let us help you make a selection.

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

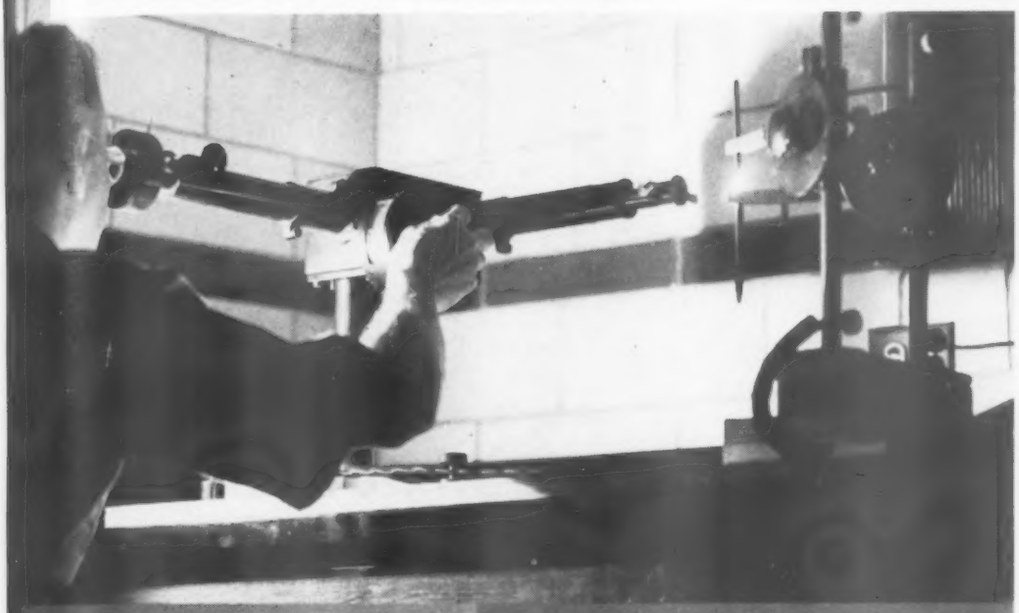
Write for fully descriptive catalog giving complete specifications.

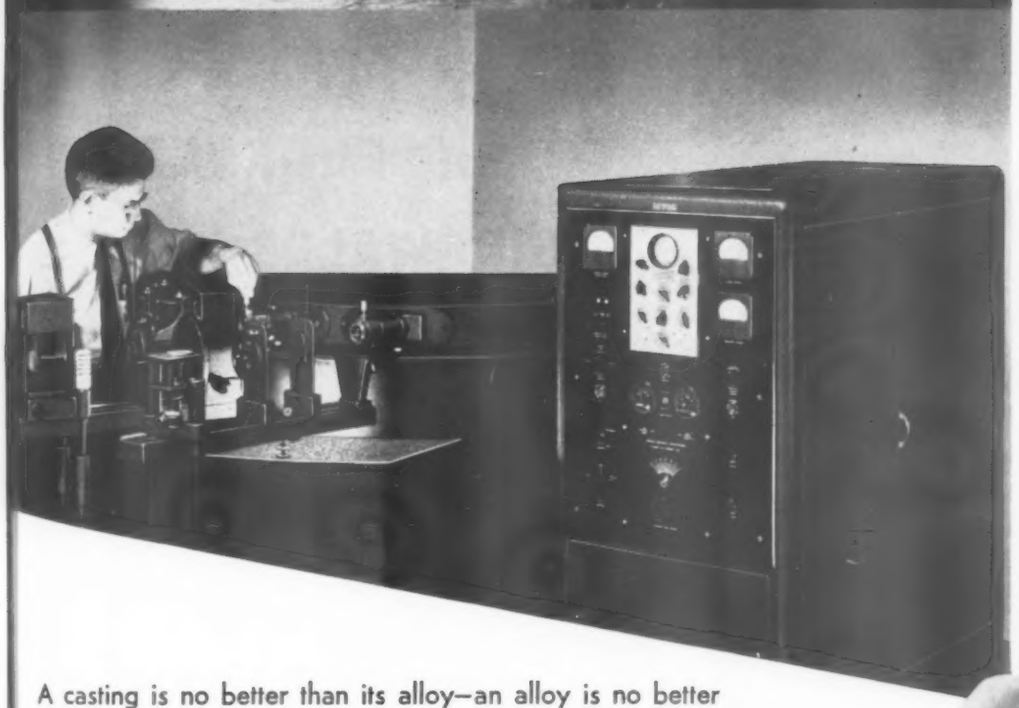
THE JOHNSTON & JENNINGS CO.
867 Addison Road • Cleveland 14, Ohio
IMPROVED UP-TO-THE-MINUTE MOLDING MACHINES FOR EVERY NEED

TECHNICAL "KNOW-HOW"

assures

PERFECT CASTINGS





A casting is no better than its alloy—an alloy is no better than the laboratory that checks every step in its production and carefully controls its chemical analysis.

Every **S-G Alloy** produced has back of it the technical knowledge of skilled laboratory men plus the finest, most modern testing equipment available.

You can rely on **S-G Alloys** to be uniform in quality and to meet your most rigid specifications. If you have a foundry or casting problem you wish solved, write to our Research Service Department. We will be glad to help you.

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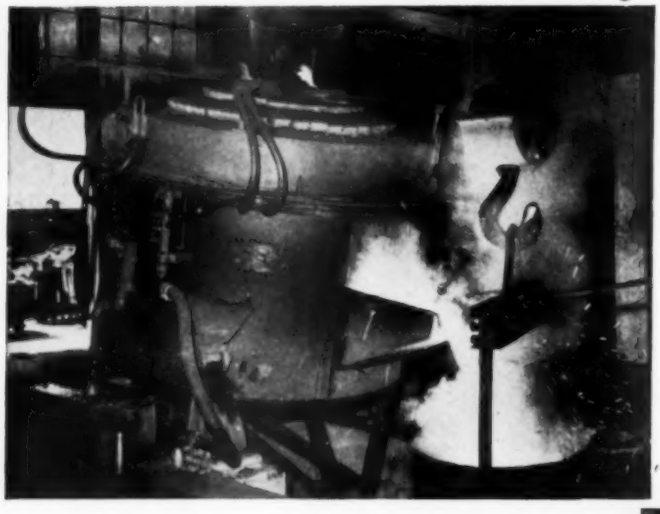
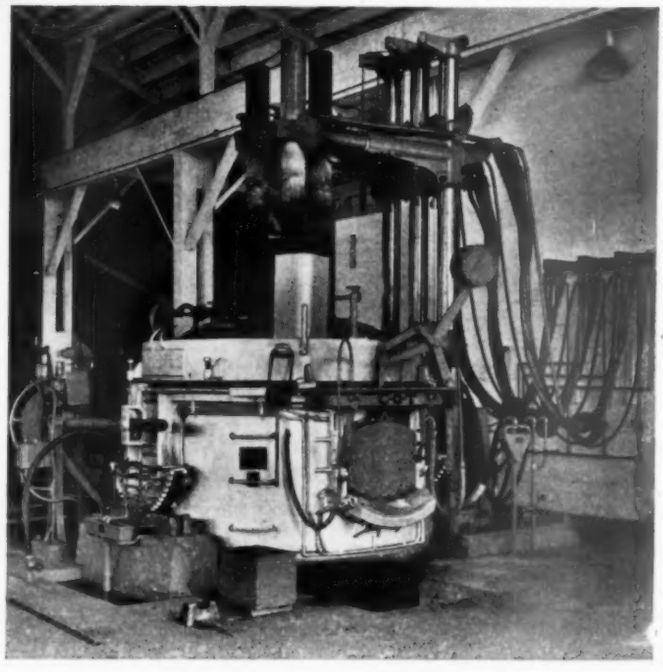


THE MONOLITHIC REFRACTORY LINING FOR ACID ELECTRIC FURNACE SIDEWALLS

Now you can have Rammed Sidewalls in your acid electric furnaces, made from a mixture of "Ironton Caro-Line" and grain sized ganister. It is quickly and easily installed with regular furnace helpers. Spalling is practically eliminated, the rammed lining is highly resistant to slags and it lasts considerably longer than ordinary silica linings. This is not an experiment—it has been used by several progressive steel foundries during the past year. Ask us for additional information on this important development.



THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

Over 1,625 Flasks EVERY HOUR!

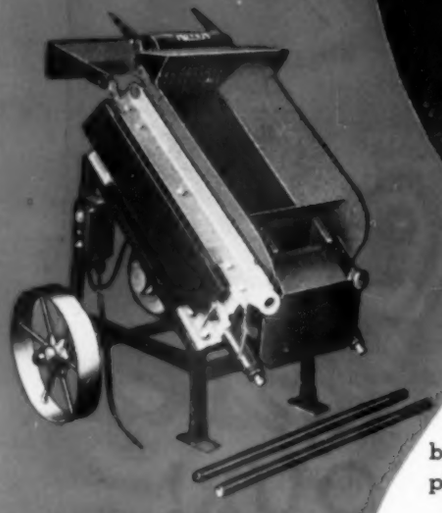
The installation above, consists of two 3′ x 8′, Model "B" Simplicity Shake-Outs. It is probably the most automatic, high speed shake-out in operation in the world today! The upper unit is equipped with a horse, or bolster over which all the flasks must pass while suspended by the arm clamps on the conveyor overhead. This upper unit shakes out over 1625 flasks per hour, while the lower unit knocks out 95% of the core sand from all fittings or castings. Over 1200 units are giving maximum service daily in over 550 foundries and handle a variety of work from a great number of flasks per hour, to 95 ton loads which are shaken out in two to three minutes. Speedier shake-out with maximum flask savings and the reduction of manpower required amortize the equipment cost in less than a year. Every Simplicity unit can be used portably until permanent installation is desirable. Have a Simplicity Engineer check your requirements.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY
DURAND, MICHIGAN

This Royer Speeds Production of Farm Equipment

Royer Model "NC-2" at Wayne Agricultural Works, Inc., Goldsboro, N. C.



Royer Model "NC-2", capacity up to 15 tons of sand per hour.

These are busy days in the foundry of Wayne Agricultural Works, Inc., producers of plows, fertilizer distributors, tobacco barn furnace equipment, tobacco field trucks and other implements which are widely used in the southeastern states.

In its efforts to "catch up" with Dixie's demand for Wayne equipment despite the manpower shortage, this foundry has reduced its sand preparation time to a minimum by installing the Royer Sand Conditioner and Blender pictured.

With a Royer, it takes one man but a few minutes to condition enough sand to keep a crew of molders busy for hours. Just shovel the sand into the hopper. The rugged, inexpensive machine does all the rest.

Sand prepared by a Royer is perfectly conditioned — the kind of sand that makes true-to-pattern molds and reduces discount. Only the Royer provides these six essential steps to correct sand preparation: the elimination of refuse; reducing the sand to a smooth, even texture, free of lumps; proper blending of old sand, new sand and bond; correct distribution of moisture; increased permeability; and proper aeration.

There's a Royer model and size for every foundry requirement. More than 7,000 Royers are now in service. Send for Catalog 744.

ROYER REPAIR SERVICE

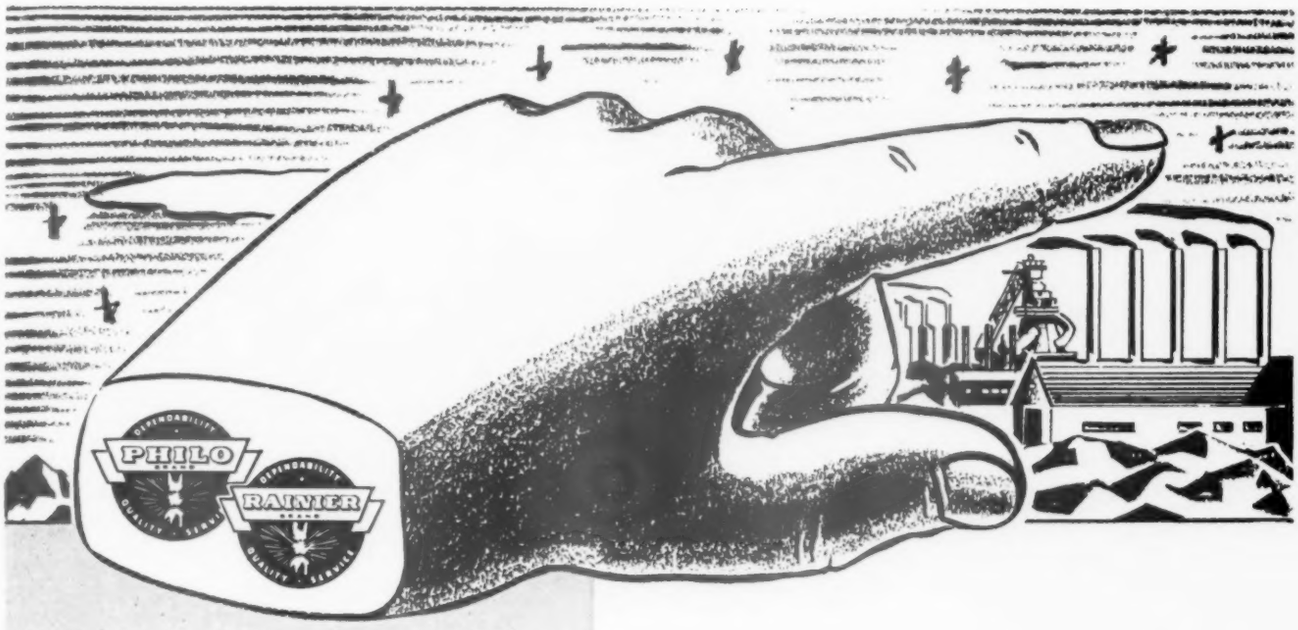
Many Royer users have found it profitable to have us overhaul and repair their old and worn machines. This service includes skilled mechanics, genuine parts and jig fits. Old Royers can be rebuilt as good as new at less than half the cost of new units.

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.

KINGSTON, PENNSYLVANIA



a firm purpose . . . faithfully maintained . . . to improve your product

The way to better production is no secret . . . it is the result of unceasing research and development. Ohio Ferro-Alloys is continually searching for new or improved ferro-alloy products and processing methods, experimenting both in the laboratory and in actual iron and steel production. Typical example of development research by Ohio Ferro-Alloys is the patented metalcast process of producing ferro silicon.

As in the past, so in the years to come—look to Ohio Ferro for quality in ferro-alloy production—for the benefit of the iron and steel industry as a whole.

FERRO SILICON 50%, 75%, 85%, 90%
H. C. FERRO CHROMIUM • FERRO MANGANESE
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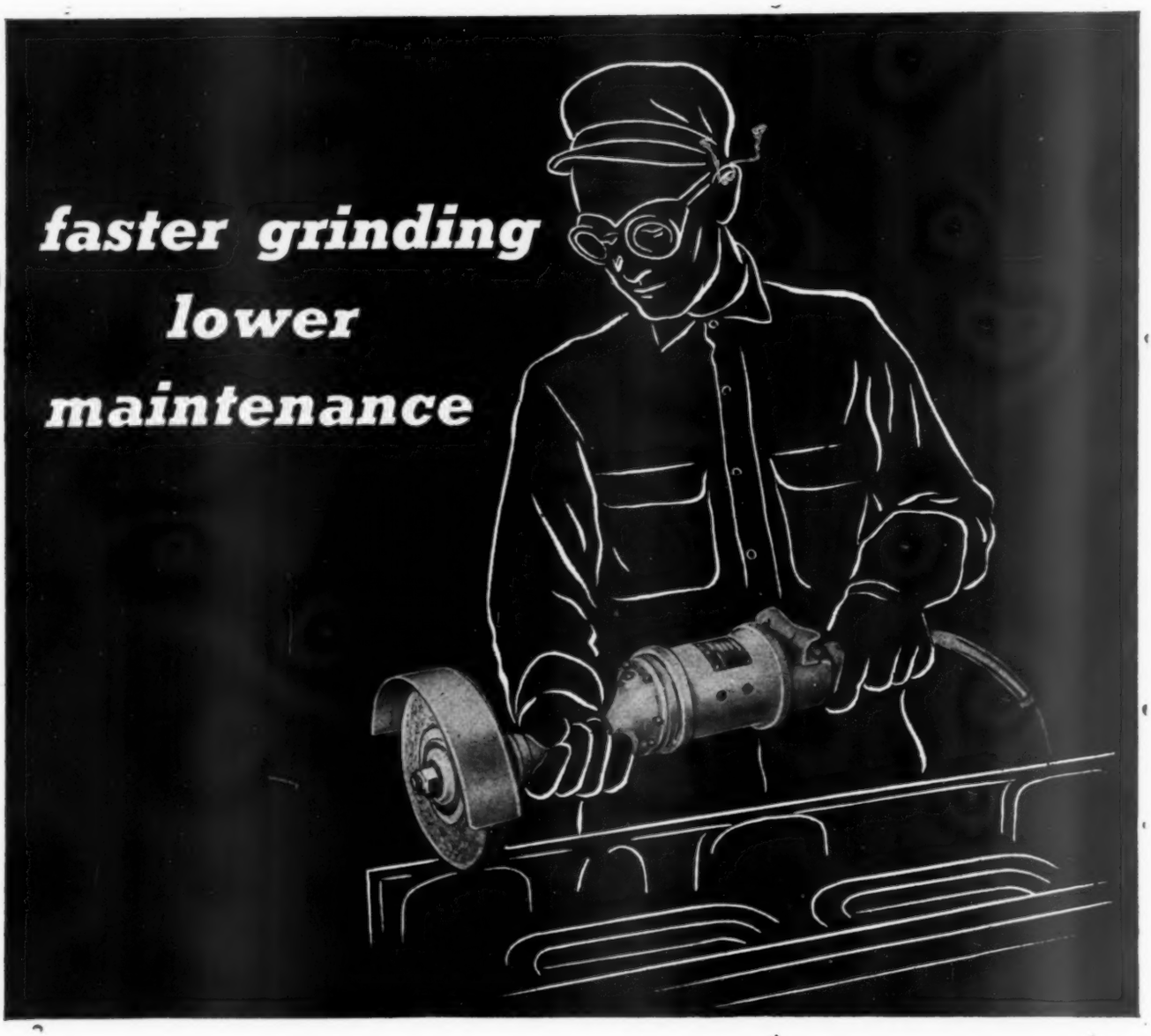

CP HICYCLE ELECTRIC GRINDERS

IN plants where grinding is an important operation, CP Hicycle Electric Grinders afford significant savings in grinding time and grinding wheel life. Because of their high, sustained speed, these perfectly balanced, cool-running grinders remove more metal in less time — minimizing emery wheel wear. Users' records show CP Hicycle Portable Tools to have the lowest maintenance expense of any type of portable tools. For full data, write today for copy of Catalog 900, 2nd Edition.

In addition to Grinders, the complete line of CP Hicycle Portable Electric Tools includes Drills and Reamers, Sanders, Buffers and Polishers, Screw Drivers, Nut Runners, Stud Setters, Tappers, Radial Arms, and Accessories.

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PNEUMATIC TOOLS
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ASK MAEHLER CORE OVEN USERS

... how Maehler Core Ovens materially reduced operating costs!

There are good reasons for the enthusiasm of Maehler core oven users. The ability of Maehler ovens to lower costs and increase production has been proved *on the job* in modern foundries of every type. The Maehler re-circulating air heat principle shortens baking time, assures perfect heat uniformity, gives you more perfectly baked cores, eliminates green or burned cores.

Why burden yourself with inefficient, costly, old-fashioned methods of core baking? Why not let Maehler help you bake more, better cores, faster, with less expense.

Maehler core and mold ovens are available in a complete range of oil fired, gas fired and electrically heated units. A Maehler engineer will be glad to go over your core baking problems with you. Write today.

THE PAUL MAEHLER CO.
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MAEHLER

93.6% of all our orders are repeat orders!

SAND RAMMER (*left*) standard for ramming specimens of molding sand and cores for the AFA green and dry permeability test and all standard strength tests.

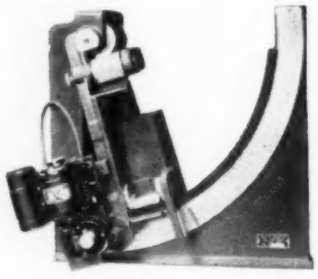
SAMPLE TRAY (*below*) for transporting sand samples to laboratory. Reduces moisture loss to a minimum.

Better Castings

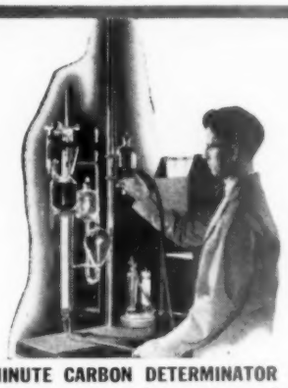
Complete sand control in the foundry requires that the physical properties of foundry sand be controlled both at room temperature and at elevated temperature. When both the room and elevated temperature physical properties of a sand, core or mold wash are controlled within desirable working ranges, the total number of hours required to make high quality castings is reduced. In addition, much less confusion is encountered. The foundry personnel also has the necessary tools available to increase their working knowledge of molding and refractory materials being used.

The Hitemp Dilatometer is an outstanding foundry research and control tool to determine the behavior of molding sands, cores, mold washes, core washes, bricks, refractory material and all ceramic materials at the elevated temperature and atmosphere at which these materials are used. Greater practical information can be secured from the Dilatometer tests than from the usual room temperature tests.

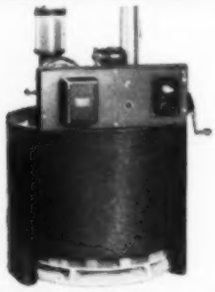
MOISTURE TELLER Will dry a fifty gram sample of high permeability molding sand in one minute by forcing electrically heated air through the test sample. Test is in exact moisture percentage by gravimetric method. No calibrations are required. *Operating cost is very low.*



UNIVERSAL SAND STRENGTH MACHINE WITH MOTOR DRIVE . . . Performs a wide variety of strength tests on molding sands, clays, cores and core pastes. You can obtain accurate results with this sturdy and reliable unit with a minimum amount of personal attention.

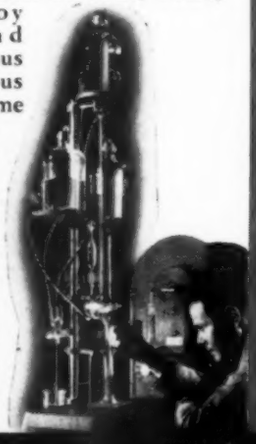


2-MINUTE CARBON DETERMINATOR enables you to determine either preliminary or final carbon content of all metals with speed and accuracy. Complete determination can be made *within 2 minutes* after sample is weighed.



TEST CORE BAKING OVEN . . . This sturdily constructed, electrically heated oven, bakes test cores or dry sand specimens entirely by convected heat. Ideal for determining the strength of core oils, binders or the quality of core sands.

TWO MINUTE SULFUR DETERMINATOR Provides rapid and accurate sulfur determination of coal, coke, irons, alloy steels and other ferrous or non-ferrous materials. Time required for a complete analysis, exclusive of weighing samples, is 2 minutes. For both preliminary and final sulfur determinations.



PERMEABILITY METER You can make accurate shop control permeability readings within 15 seconds with the Permeability Meter. Widely used for measuring green, dry and baked A.F.A. permeability of molding sands, cores and molds. Use the Permeability Meter to improve sand conditions in your foundry.

CONTROL EQUIPMENT SAVES TIME

Harry W. Dietert Co.

9330 ROSELAWN • • • DETROIT 4, MICH.

-valuable help that's yours for the asking

More than one foundryman has been both pleased and surprised when a visit from the Republic Pig Iron Metallurgist resulted in greater production at lower unit casting costs. Pleased, too, that it was brought about by a seemingly minor change in operations.

Perhaps you also can profit substantially by talking to this man. It is very much the exception when he cannot make some suggestion to benefit a foundry.

Why? Because he is more than a skilled metallurgist. He has spent many years working in foundries . . . knows foundry methods from A to Z. He's a practical foundryman who speaks foundrymen's language.

Remember that his services are yours for the asking. The only obligation is his—and that, to help you realize absolute maximum production with your present equipment. Write, wire or phone us. He will call on you . . . PROMPTLY.

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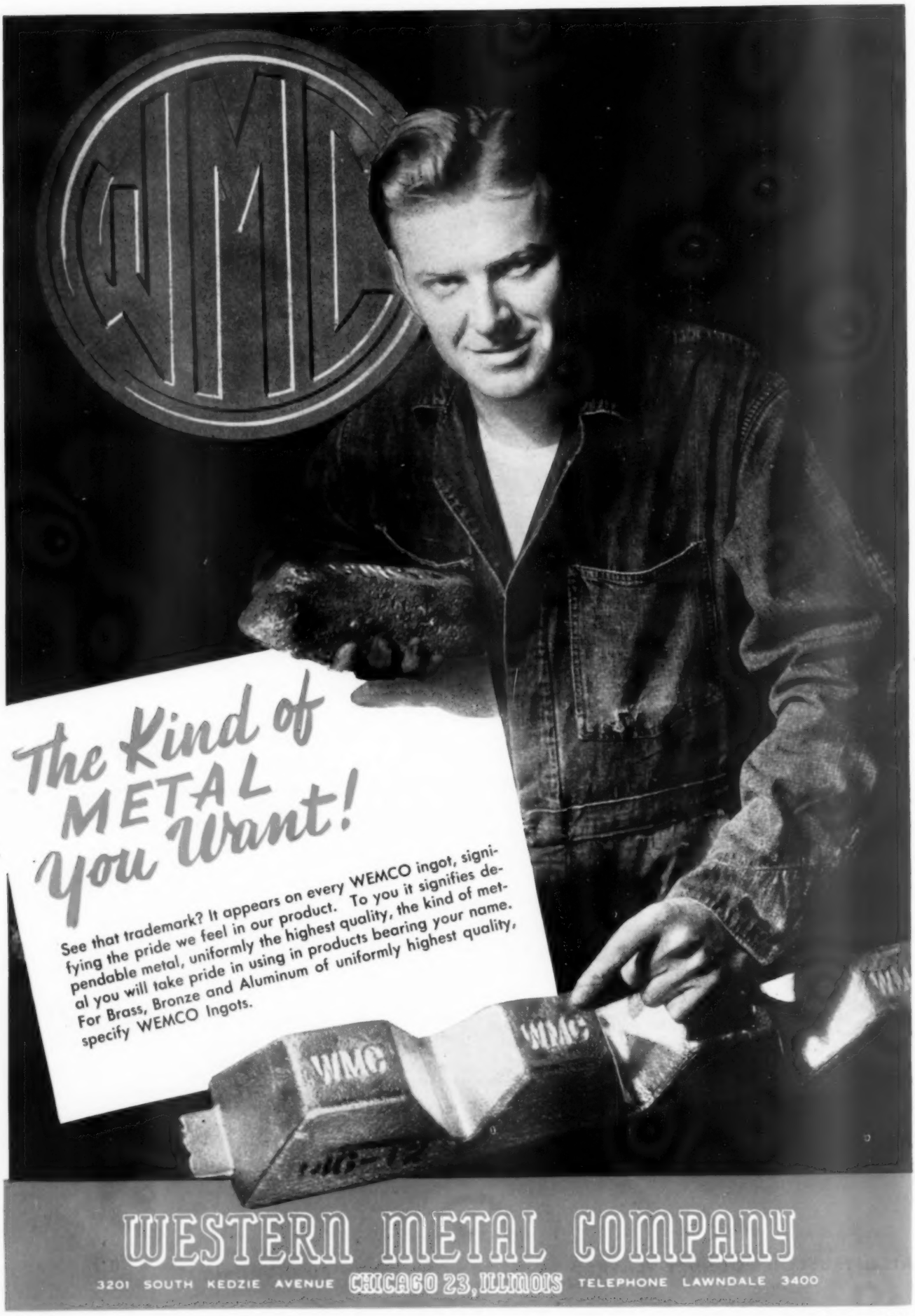
Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS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The Kind of METAL You Want!
See that trademark? It appears on every WEMCO ingot, signifying the pride we feel in our product. To you it signifies dependable metal, uniformly the highest quality, the kind of metal you will take pride in using in products bearing your name. For Brass, Bronze and Aluminum of uniformly highest quality, specify WEMCO Ingots.
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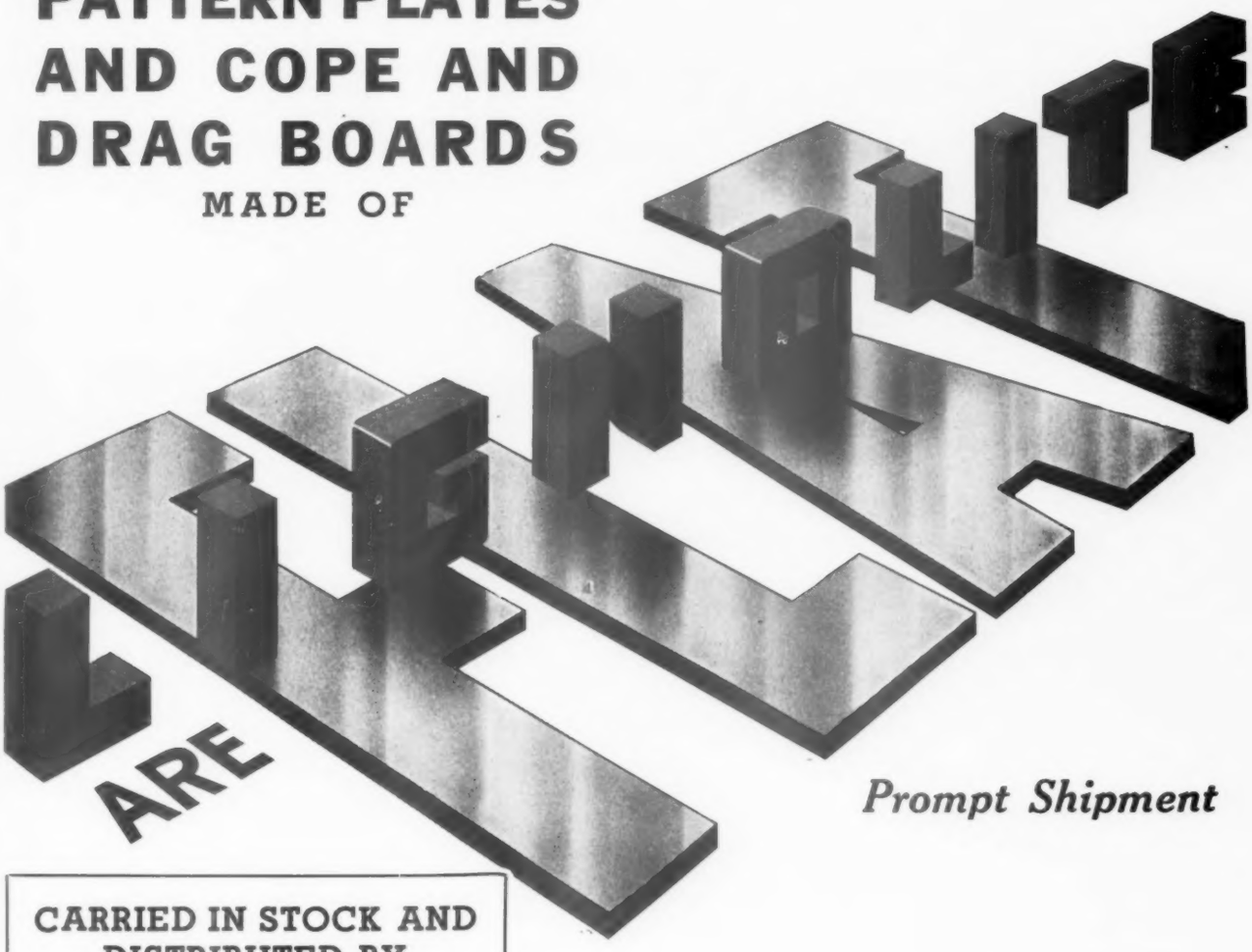
PATTERN PLATES AND COPE AND DRAG BOARDS

MADE OF



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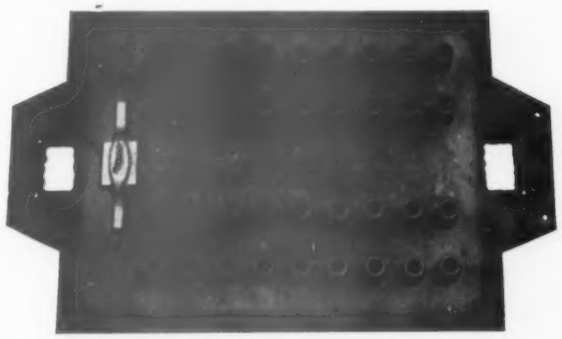
● They stay flat because LIGNOLITE has high transverse strength and resistance to deflection. It is impervious to moisture and does not warp from contact with wet sand or high humidity. LIGNOLITE is half the weight of aluminum, is abrasion proof, of uniform caliper, and may be easily machined, sawed, drilled, tapped. Available in all flask sizes 7/16" to 2" thick or in sheets for own cutting. Write for sample and complete information.



Mounted LIGNOLITE Pattern Plate

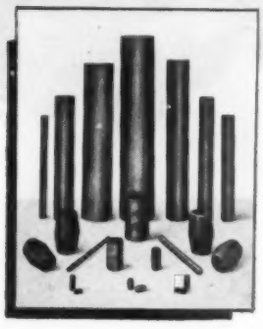
MARATHON CORPORATION

CHEMICAL DIVISION — **ROTHSCHILD, WISCONSIN**

names worth remembering . . .

★★★★★ **GIROD** for introducing the first arc-resistance furnace in 1906

★★★★★ **INTERNATIONAL** for Graphite Electrodes with High Thermal Conductivity



THE complete graphitization of INTERNATIONAL Electrodes assures quick availability of the heat produced. This property of INTERNATIONAL Graphite Electrodes means maximum service life and minimum power consumption.

Purity, strength, high density, low electrical resistance, oxidation resistance, uniformity of structure . . . these are some of the *other* qualities of INTERNATIONAL Electrodes which have established a preference for them wherever standards are set for electric furnace efficiency.

INTERNATIONAL Graphite Electrodes have been consistently used for years by leading *producers* of fine electric furnace steels and by principal electric furnace *manufacturers* as well. These users know that the name INTERNATIONAL denotes a graphite electrode which has all the necessary characteristics for attaining lowest electrode cost per ton of steel production. Write for further details.

SPECIFY INTERNATIONAL ELECTRODES FOR—
Slow consumption • High current capacity
Low rate of oxidation • High thermal conductivity
Consistently uniform properties and dimensions
Low cost per ton of production

591

International Graphite & Electrode Corp.
SAINT MARYS, PA.

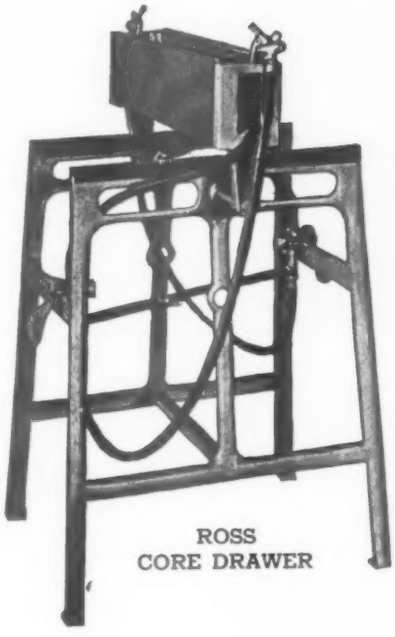
BETTER FOUNDRY EQUIPMENT

GAST CORE AND MOLD SPRAYER

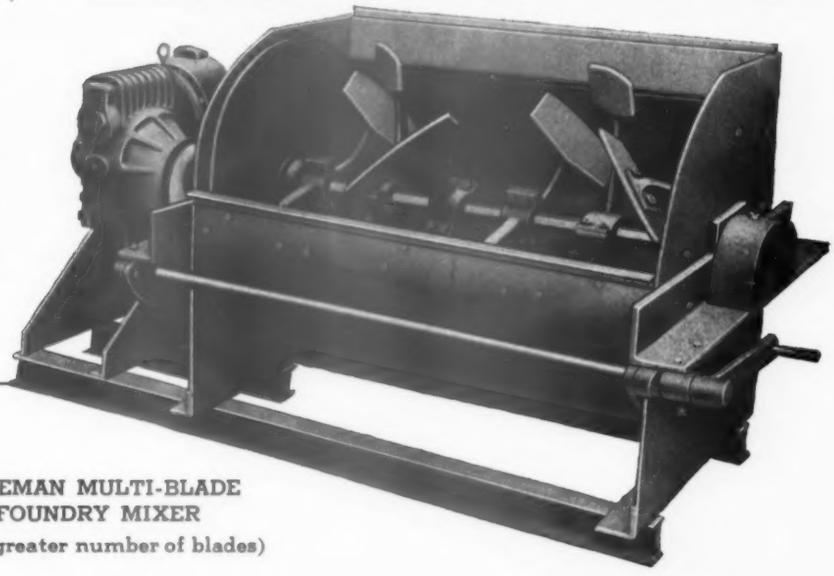
GAST CORE AND MOLD SPRAYER—This is a low-pressure, large jet atomizing sprayer, equipped with an air motor. It has a gear driven, paddle agitator for applying any type of wash to either green or dry sand molds or cores. It is regularly used with silica, naphtha or gasoline, talc and synthetic washes as well as the graphite or coke based materials. Wash is kept in suspension by paddle agitator when sprayer is used. Send for the whole story!

ROSS CORE DRAWER—If you are faced with a manpower problem (and who isn't?), remember that highly skilled labor is not required to draw cores on this machine and the more difficult boxes can be drawn just as fast as the easy ones. Many core boxes require no rigging at all. The Ross Core Drawer makes cores come true to size. Write for descriptive folder.

FREEMAN MULTI-BLADE FOUNDRY MIXER—Here is a mixer which has everything built-in as standard equipment, and includes many features not even available as accessories on other mixers. Send for a new booklet which explains how differently this mixer is built and just what you may expect of its operation in your plant.



ROSS
CORE DRAWER



FREEMAN MULTI-BLADE
FOUNDRY MIXER
(Note greater number of blades)

The Freeman Supply Company

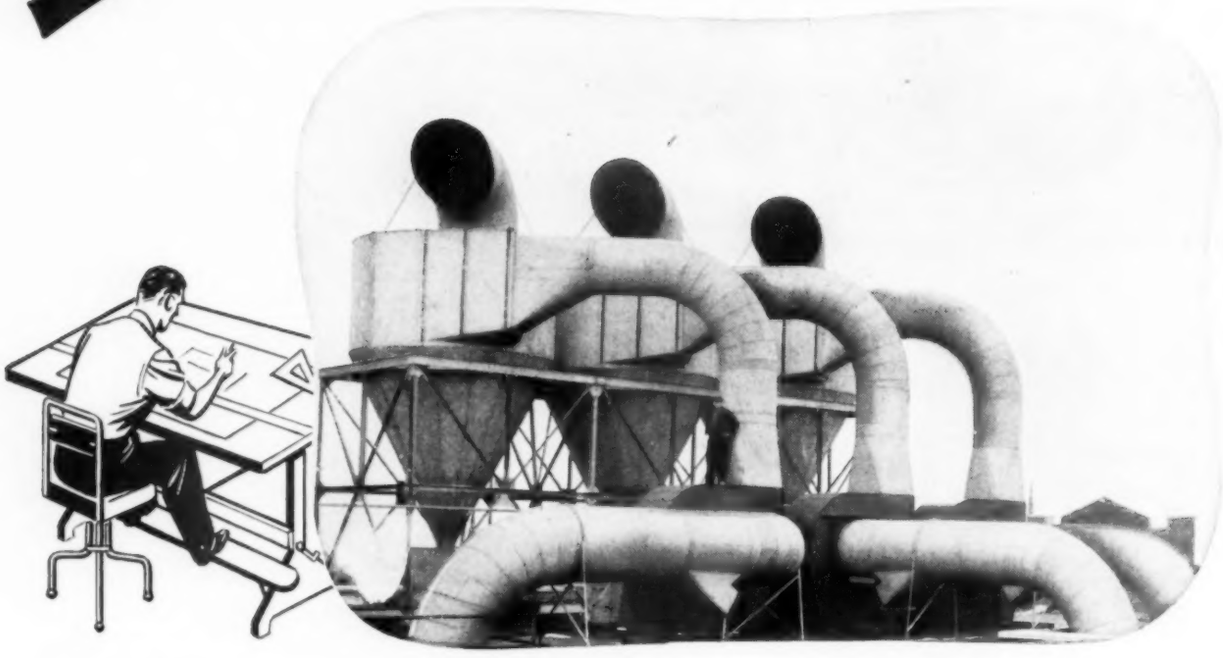
Pattern Shop & Foundry Supplies & Equipment

Mahogany and Pine Pattern Lumber

1152 East Broadway TOLEDO 5, OHIO Tel. TAylor 4624

Back of

EVERY KIRK & BLUM
Dust Control INSTALLATION



...38 YEARS OF
Specialized Engineering Experience

● No sudden "inspiration" or new-era "magic" accounts for the superior performance and economy of Kirk & Blum dust control installations.

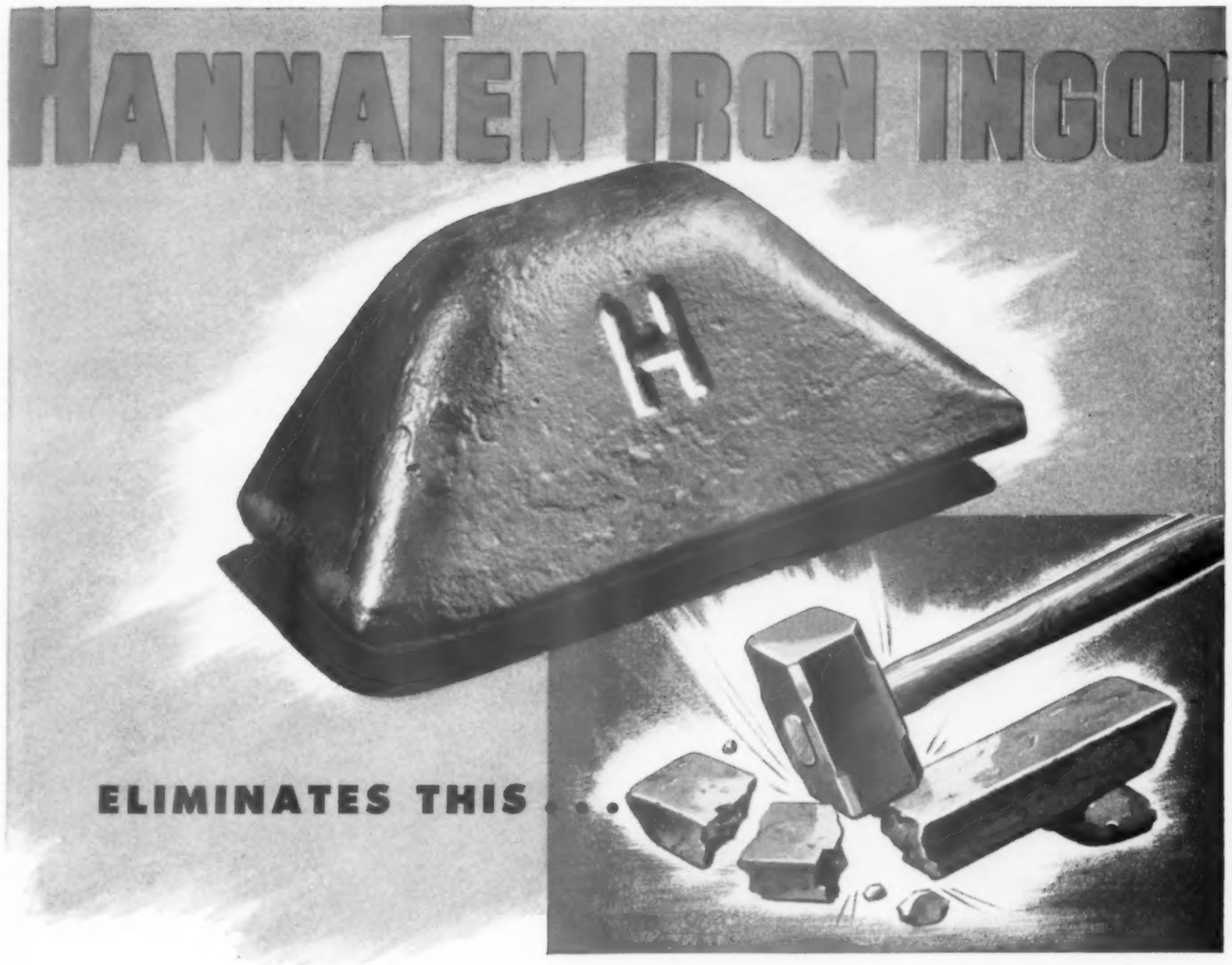
Kirk & Blum success is due to sound, practical engineering know-how, gained slowly and soundly through 38 years of specialization . . . 38 years of solving every known type of dust control problem.

In size, facilities, and satisfied customers—including leading industrial plants throughout the nation—the Kirk & Blum organization has advanced from early pioneering days to its present recognized position in the industry. Yet its basic character and ideals remain the same, rooted as they are in a management and personnel which for the major part has been with us for more than three decades.

For a complete new dust control installation, or a remodeling of your present equipment, you will find it pays to rely on Kirk & Blum's long-accumulated knowledge and skill. For details, write to The Kirk & Blum Manufacturing Co., 2803 Spring Grove Ave., Cincinnati 25, Ohio.

KIRK AND BLUM
AN ORGANIZATION OF ENGINEERS AND MECHANICS

HannaTen Iron Ingot



For foundries that find larger pig better suited to their needs, the 38-pound Hanna Pig is available in all grades and brands.

THE BEST KNOWN HANNA NAME IN IRON

You can get an accurate furnace charge with HannaTen without resorting to sledge hammers. Accurate weight and chemical analysis for every charge can be secured easily: each ingot weighs approximately ten pounds, and has a precise chemical content, making it easy to "balance off" each charge.

Additional advantages of faster handling at all times, and faster, more uniform melting, have already won the widespread approval and preference of foundry men for HannaTen.

A Hanna metallurgist can show you how HannaTen will meet your foundry needs with greater efficiency and more savings for you. Just write, phone or wire the nearest Hanna office.

THE HANNA FURNACE CORPORATION

BUFFALO • DETROIT • NEW YORK • PHILADELPHIA • BOSTON

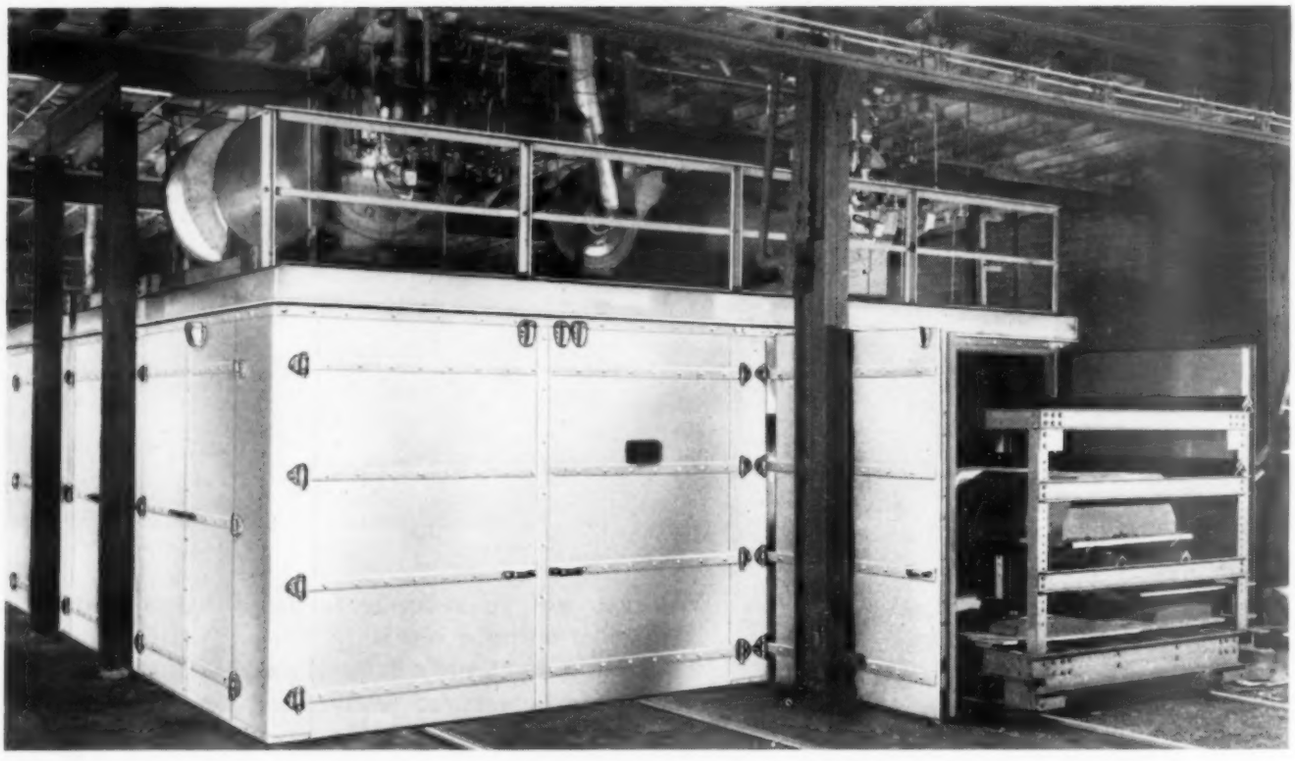
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION

CARL-MAYER

CORE and MOLD OVENS

Designed for Individual Needs!

ALL TYPES • ALL SIZES



CARL-MAYER TWO-COMPARTMENT CAR TYPE OVEN FOR CORES AND MOLDS. Each oven, 12′ wide, 26′ deep, 9′ high. One oven is used for baking large cores at night and has doors on side, permitting its use as a rack type oven during the day. Other oven is for night baking. Both compartments are individually heated by a Carl-Mayer recirculating type gas-oil heater enabling use of either gas or oil.

THE above photo shows one of many exclusive Carl-Mayer oven designs specially adapted for highest efficiency and operating economy.

For more than 25 years leading foundries have come to Carl-Mayer again and again to meet their additional core and mold oven needs.

Before you decide on your next foundry oven installation, consult Carl-Mayer. Let us show you the production and fuel saving advantages of Carl-Mayer equipment.

Write for Bulletin showing various types of Carl-Mayer Ovens.

SERVING CONCERNS LIKE *these*--

Aluminum Co. of America
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
Shenango Penn Mold Co.
Studebaker Corp.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

THE CARL-MAYER CORPORATION

3030 Euclid Avenue • Cleveland, Ohio

Government-Owned

SURPLUS STEEL

Reasonably priced for substitute uses

AVAILABLE NOW

Terms to fit your production budget

Over 50,000 tons of hot rolled and cold finished carbon and alloy steel bars in rounds, squares, flats and hexagons, priced downward—for substitute uses.

Budget priced, these 50,000 tons consist of 25,000 tons of carbon and 25,000 tons of alloy H.R. & C.F. bars, in sizes to meet your immediate requirements.

In addition, there are 60,000 tons of carbon and alloy billets, blooms and slabs. These semi-finished products are also priced for quick delivery in meeting the demands for substitute uses. If you qualify for credit, terms may be arranged. For detailed specifications, grades, sizes, deliveries and F.O.B. prices, simply write, wire or phone the nearest RFC Agency listed below.

WHAT ARE YOUR REQUIREMENTS? — CHECK THIS LIST

1. Carbon and Alloy Billets, Blooms, Slabs, Skelp, Rods, etc. . . . . ☐
2. Reinforcing Bars . . . . . ☐
3. Structural Steel Shapes . . . . . ☐
4. H. R. & C. R. Sheets, Strip Steel, Carbon and Alloy . . . . . ☐
5. Plates—Tin Plate, Terne Plate, Black Plate . . . . . ☐
6. Wire and Wire Products, Carbon and Alloy, Wire Rope, Reinforcing Wire Mesh . . . . . ☐
7. Stainless Steel Sheets, Strips, Standard Types . . . . . ☐
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Name .....

.....

Firm .....

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Address .....

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VETERANS: **To help you in purchasing surplus property from the RFC, a veterans' unit has been established in each of our Disposing Agencies.**

RECONSTRUCTION FINANCE CORPORATION

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION

Agencies located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver Detroit • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

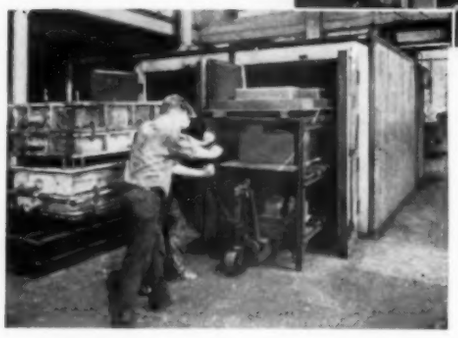
157-2

✓ Cores O.K.

When Uniformly Baked in GEHNRICH OVENS

Multiple pull-drawer type core oven with recirculation heating from an external gas-fired air heater.

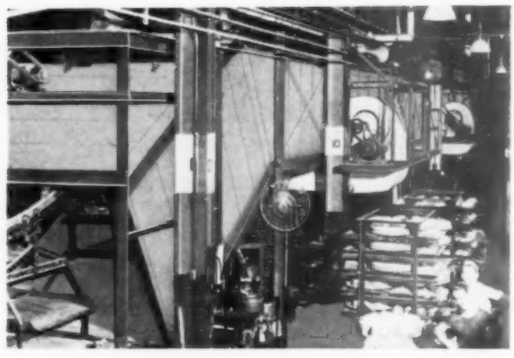
And fast, too, when you do it in a Gehnrich Oven, regardless of whether it's a small batch loading unit or a continuous conveyor type. The correct application of recirculating heating—gas, oil, coke or electric—the Gehnrich way produces better, stronger cores and molds, regardless of size, variety and quantity. Many of the biggest foundries—as well as hundreds of smaller ones—are getting top quality output with Gehnrich Ovens.



Two - compartment core and mold oven with integral oil-fired recirculation heating system.

●

Large continuous monorail - rack core oven with preheating and baking zones and recirculation heating.

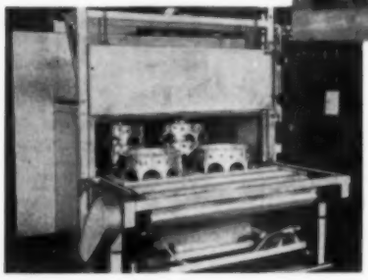


✓ Castings O.K.

When Properly Annealed in ROCKWELL FURNACES

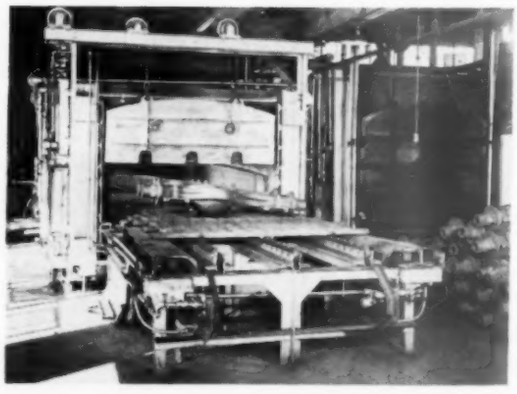
Whether you need an oven furnace type for small castings, a car type for large batches of large or small castings, or a continuous furnace, let Rockwell design the right furnace for your annealing job. In a Rockwell annealing furnace—oil, gas or electric —you are assured of uniform heating of ferrous or non-ferrous castings under the exacting conditions of furnace atmosphere to assure both metallurgical quality and surface appearance.

Battery of oven or hearth type oil-fired furnaces for batch annealing of small castings.



Intermittent conveyor, electric recirculation heated furnace for preheating aluminum castings.

Tray-loading, pusher type, gas-fired furnace for normalizing large axle housings; individual heating of castings has reduced subsequent machining time.



Write for Catalogs

GEHNRICH OVENS • ROCKWELL FURNACES

W. S. ROCKWELL COMPANY • 210 ELIOT STREET • FAIRFIELD, CONN.

READY ACCESSIBILITY FOR RECONDITIONING!

Many Schneible collectors have been in service over 10 years, hundreds over 5 years, and all of these have operated overtime throughout the war years.

Another advantage of Schneible Multi-Wash Dust and Fume Collectors

The reason why Schneible Multi-Wash Collectors have so often been called "lifetime dust collectors" is that there are no moving parts in the collector tower, and by recoating the interior walls and the impingement trays with Bitumastic paint to prevent erosion and oxidation approximately every three years, the units will last indefinitely.

There are no moving parts inside the Schneible Collector—no bags or screens. Nothing to clog, burn or rapidly wear. Erosion and oxidation — the only threat to permanent operation — is readily controlled by the infrequent application of Bitumastic paints to the interior — at about three year intervals. Schneible collectors are provided with three access doors through the shell, and manholes through the deflector plates, which permit accessibility to all interior surfaces for reconditioning.

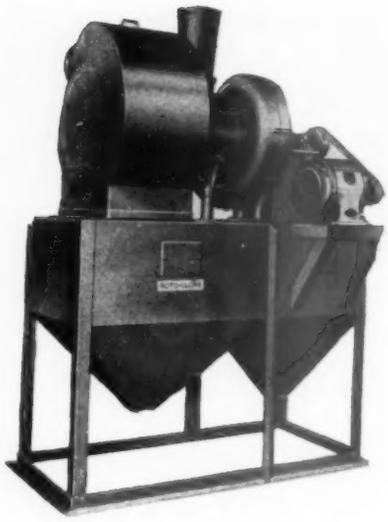
The low maintenance and the high efficiency of Schneible equipment is the talk of the foundry industry—small wonder so many foundries have completely rid themselves of the dust problem with correct Schneible foundry ventilation and dust control equipment. Send for *new* Bulletin No. 310.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St., Detroit 16, Mich.
Engineering Representatives in Principal Cities

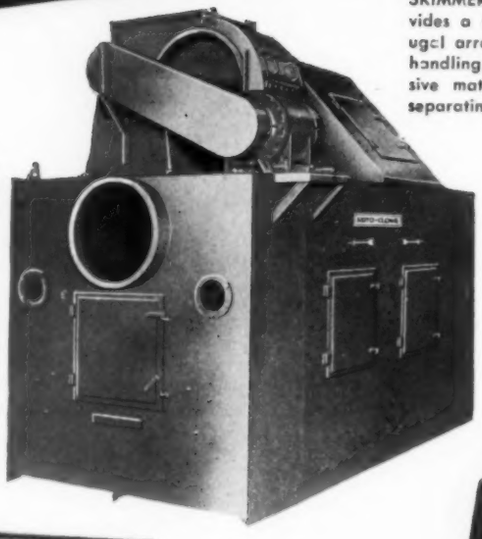
SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

Foremost IN FOUNDRY DUST ENGINEERING

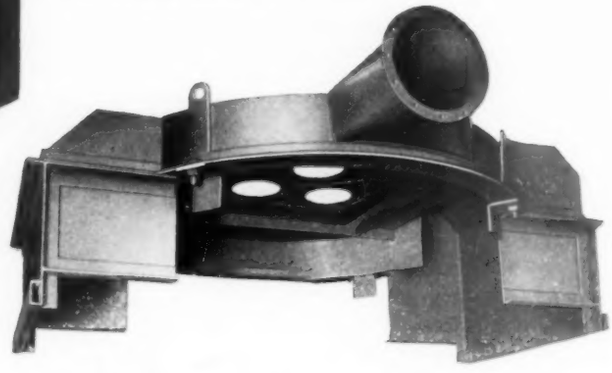


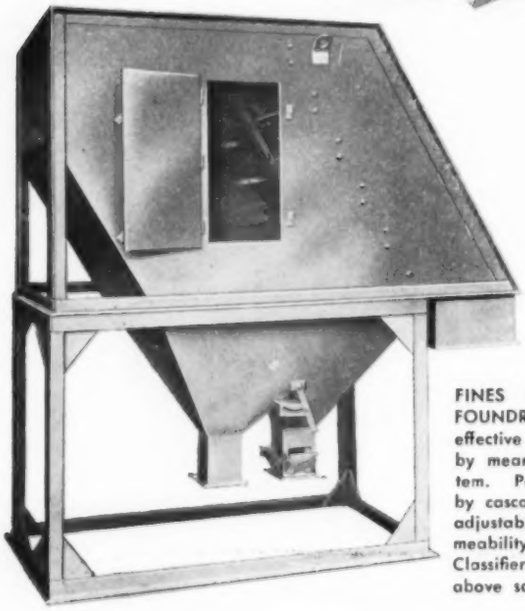
TYPE D ROTO-CLONE WITH SKIMMER PRECLEANER provides a two-stage dry centrifugal arrangement, capable of handling heavy loads of abrasive material with high dust separating efficiency.



ROTO-CLONE TYPE N is designed to meet special requirements of magnesium dust control and ideally suited to all buffing operations. Small Type N units may be located directly in back of grinding or polishing stand. Material collected with high efficiency and stored safely under water.

ELECTRIC FURNACE EXHAUST HOOD is a patented method of applying local exhaust to electric furnace fumes. Designed to fit individual requirements, free from interference with charging and pouring.



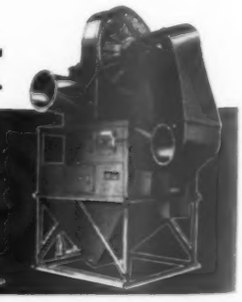


FINES CLASSIFIER FOR FOUNDRY SAND provides effective removal of fines by means of exhaust system. Positive separation by cascade action, quickly adjustable for varying permeability requirements. Classifier is usually mounted above sand storage.

The application of Roto-Clone dust control to foundries embraces every operation where dust is either a hazard or a nuisance. Several new Roto-Clone designs and ingenious methods of application, based on extensive experience in foundry practice, are shown on this page. Roto-Clones are available in three types—Type W, the Wet Dynamic Precipitator for general foundry dust control, particularly shakeout, sand conditioning, and abrasive cleaning; Type D, the Dry Dynamic Precipitator for grinding, snagging, portable and swing frame grinders; and Type N, the new Hydrostatic baffle type wet collector. Send for free Bulletins.

AMERICAN AIR FILTER COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky • In Canada: Darling Bros., Ltd. Montreal, P. Q.



ROTO-CLONE

FOR FOUNDRY DUST CONTROL

CORROSION RESISTANCE

FRONTIER ALLOY "40-E"

A HIGH STRENGTH ALUMINUM *Alloy* THAT NEEDS NO HEAT TREATMENT

The metallurgical formula of Frontier "40-E" Alloy overcomes the corrosion danger commonly encountered in certain types of aluminum alloy containing zinc. Frontier "40-E" is highly resistant to the action of corrosive atmospheres and liquids. What's more this desirable corrosion resistance is applicable to the metal under stress (stress corrosion) as well as to unstressed sections. Here, definitely, is significant development in the field of aluminum alloys.

ENGINEERING DATA ON REQUEST

The Frontier Alloy Data Book brings pertinent engineering and metallurgical facts on the physical properties of "40-E". In writing for your free copy, please state company name, your title, and address.

Licensing franchises now available in certain areas to meet the increasing demand for Frontier "40-E" Alloy. Details on request.

1. **Shock Resistance**—Tests have proved its exceptional ability to withstand explosive shock and standard impact shock.
2. **Corrosion Resistance**—Excellent, not only in standard corrosion tests but also under stress.
3. **High Yield Strength**—A dominant factor where distortion or misalignment of parts would make the assembly inoperable.
4. **Machineability**—Far superior to the usual sand cast aluminum alloys and machined parts have a high lustre.
5. **Pressure Tightness**—The fine grain of the alloy enables it to withstand high pressures.
6. **No Heat Treatment**—Physical properties are obtained by natural aging at room temperatures.

Specifications — Army-Navy Aeronautical Spec. AN-A-17; U. S. Navy Bureau of Ships Spec. 46A-1 (INT), Class 1, A. S. T. M. Spec. B26-42T, Alloy ZG-41, S. A. E. 310.

Typical Physical Properties — tensile strength, 35,000 psi.; yield strength, 25,000 psi.; elongation, 5% in 2".

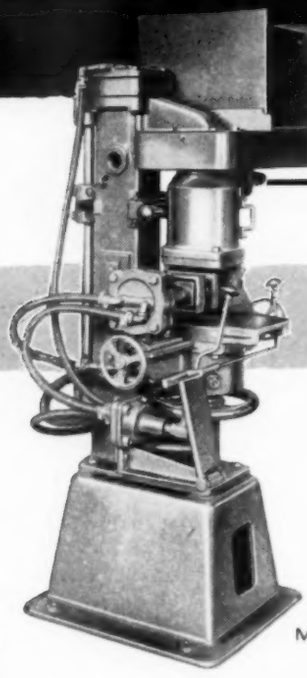
FRONTIER BRONZE CORPORATION

4878 PACKARD ROAD

NIAGARA FALLS, NEW YORK

MODEL 3E

LARGE OR SMALL



MODEL O

DEMMLER MACHINES PRODUCE BETTER CORES

Large or small, the best and most economical way to make a core is to blow it—with a DEMMLER CORE BLOWING MACHINE!

Manufactured continuously since 1911, Demmler machines today reflect the years of "know how" acquired building coreblowers that are sturdy, easily adjustable and safe to operate.

DEMMLER users speak highly of the diaphragm valve employed in DEMMLER models. It's efficient, simple—yet trouble-free!

INQUIRIES INVITED

If you are producing cores in commercial quantities, you can do the job better and cheaper with a DEMMLER CORE BLOWING MACHINE. Years of experience qualify DEMMLER in recommending how a core job can be performed with the utmost efficiency and economy. The service is yours for the asking.

SPECIFICATION CIRCULARS ON REQUEST

Wm. DEMMLER *& Bros*

Kewanee, Illinois

MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

SWINDELL

ELECTRIC ARC

MELTING FURNACES

Equipped with
G-E AMPLIDYNE
CONTROL

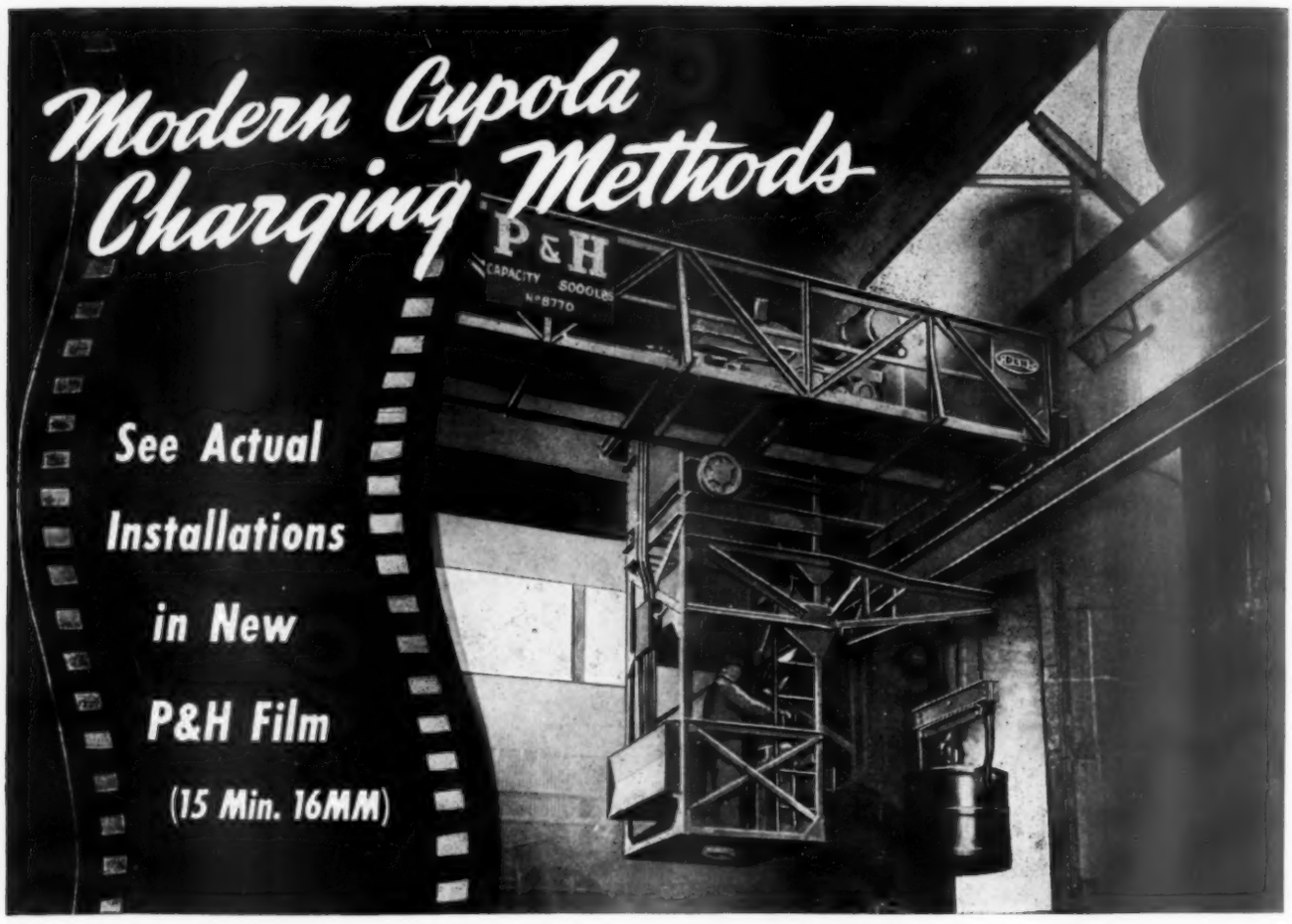
provides MORE TONNAGE WITH LESS POWER—
MORE CONSTANT, UNIFORM CONTROL—
LOW MAINTENANCE-CONTINUOUS OPERATION

Swindell-Dressler and General Electric now combine to provide makers of steel with complete *ACCURACY* and *PRECISION CONTROL* for Swindell Electric Arc Melting Furnaces.

Swindell engineers welcome the opportunity to discuss this development . . . the many ways in which it will provide greater tonnage . . . lower maintenance costs . . . and dependable accuracy of control.

SWINDELL-DRESSLER *Corporation*
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.

Continue to buy War Bonds



Shows New Improvements in Both *Controlled* and *Fixed* Discharge Methods

Which system is best suited to your operation — to help insure highest efficiency in postwar markets? The P&H film showing working installations in two leading foundries will help you decide. Make a note to see this film soon.

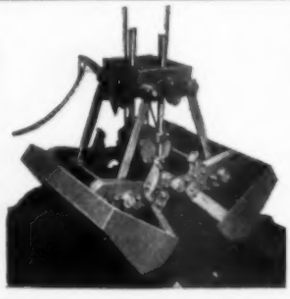
Where much equipment and a lot of re-handling of materials were formerly required, with many men working under difficult conditions, cupola charging is now done with amazing speed and simplicity. In addition to making important savings in manpower and time, finer control of melting and lower cupola maintenance costs are made possible.

Either method, *Controlled* or *Fixed* discharge, is flexible . . . an advantage that allows installation to fit your requirements.

FILM SHOWN ON REQUEST

In 15 minutes, the P&H film shows what improved cupola charging is doing in modern foundries. On request, P&H will gladly arrange — without obligation — for you to see the film and answer all your questions. Just drop a note to the address below.

General Offices: 4405 West National Ave., Milwaukee 14, Wis.



Single Line Grab Buckets for Foundries

Hang this bucket on a regular crane hook and it's ready to work. No changes in cable reeving are necessary—no complicated hook-ups or switch-over delays. Ideal for handling sand and refuse, digging pits, filling flasks, etc. A real manpower saver. Write for Bulletin C-27.

P&H

CUPOLA CHARGING CRANES

HARNISCHFEGER CORPORATION

ELECTRIC CRANES · EXCAVATORS · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

Foundries using Aluminum Alloy Ingot produced by competent Smelters enjoy four-way savings.

1. SAVE TIME—Ingots already alloyed prevent lost time due to bad castings resulting from metal of unknown composition. Ingot can always be handled with much greater ease than scrap.
2. SAVE MONEY—Alloying done in large heats, to your exact specification, insures uniformity and fewer rejects.
3. SAVE SPACE—Compact ingots require a minimum of space for storage.
4. SAVE WORRY—Statement of analysis available for each heat provides known composition. No complicated alloying or analysis problems.

Our Members are always glad to discuss these savings, or to consult with you regarding casting problems.

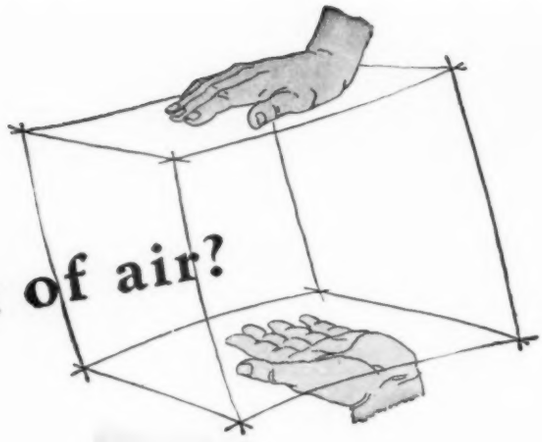
Aluminum Research Institute

111 West Washington Street, Chicago 2, Illinois

MEMBER · ALUMINUM RESEARCH INSTITUTE

Federated Metals Division American Smelting & Refining Company *New York City 5 and Branches*	The National Smelting Co. *Cleveland 5, Ohio*	Aluminum and Magnesium, Inc. *Sandusky, Ohio*
General Smelting Company *Philadelphia 34, Pennsylvania*	Niagara Falls Smelting & Refining Corp. *Buffalo 17, New York*	The American Metal Co., Ltd. *New York City 6*
Samuel Greenfield Co., Inc. *Buffalo 12, New York*	North American Smelting Co. *Tioga and Edgmont Sts. Philadelphia, 34, Pa.*	Apex Smelting Co. *Chicago 12, Illinois*
William F. Jobbins, Inc. *Aurora, Illinois*	Sanken-Galamba Corporation *Kansas City 18, Kansas*	Berg Metals Corporation *Los Angeles 11, California*
R. Lavin & Sons, Inc. *Chicago 23, Illinois*	U. S. Reduction Co. *East Chicago, Indiana*	The Cleveland Electro Metals Co. *Cleveland 13, Ohio*

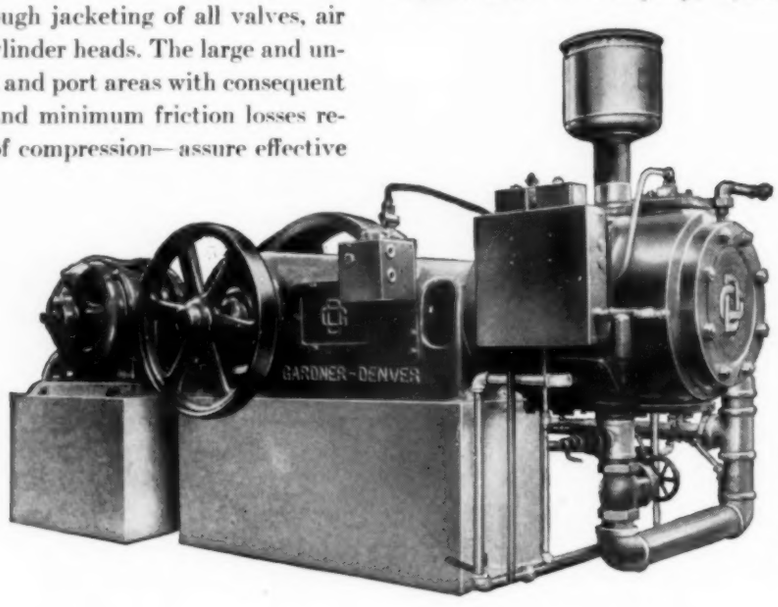
How much will it cost YOU to "squeeze" a foot of air?



Any air compressor will "squeeze" air for you. But how well will that job be done—how much power will it take to compress a cubic foot of air to the pressure you require?

The cylinder design of your compressor has a lot to do with that question. In the Gardner-Denver "RX" Horizontal Compressor, for example, the cylinders are of advanced design to provide higher volumetric efficiency and lower horsepower requirements. The air valves are located radially at each end of the cylinder to permit thorough jacketing of all valves, air passages and cylinder heads. The large and unrestricted valve and port areas with consequent low velocities and minimum friction losses reduce the heat of compression—assure effective lubrication. Add it up—it means *lower cost.*

Better cylinder design is only one of the many outstanding features of the Gardner-Denver "RX" Compressor. Let us tell you why "RX" compressors have made a name for themselves in industry—for full facts, write Gardner-Denver Company, Quincy, Illinois.



Gardner-Denver "RX" Horizontal Single Stage Compressor—capacities from 89 to 1292 cu. ft. displacement per minute.

GARDNER-DENVER

Since 1859

- No compressor is better than its valves—and in the "RX" compressor, Gardner-Denver duo-plate cushioned valves provide high compression efficiencies with lowest power consumption. These valves are "air cushioned" for long life.
- Rugged main frame is completely oil and dust-tight, yet provides easy access to all working parts.
- The entire lubricating system is positive, automatic and foolproof.
- Timken adjustable double row tapered roller bearings on crankshaft provide considerable overload capacity with consequent long life.

JEFFREY FLASK FILLERS

TO FIT EVERY FOUNDRY

Fill Every Need

WITH THE TOUCH OF A BUTTON

Time for preparing a mold is often reduced one-third to one-half with Jeffrey Flaskfillers.

They eliminate back-breaking shoveling by directing a constant, easily-handled flow of sand into the flask under push-button control.

There are Jeffrey Flaskfillers in styles and sizes to meet every foundry condition. Let a Jeffrey Foundry Engineer make recommendations.

Send for Catalog No. 690

THE JEFFREY MANUFACTURING COMPANY

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ESTABLISHED 1877

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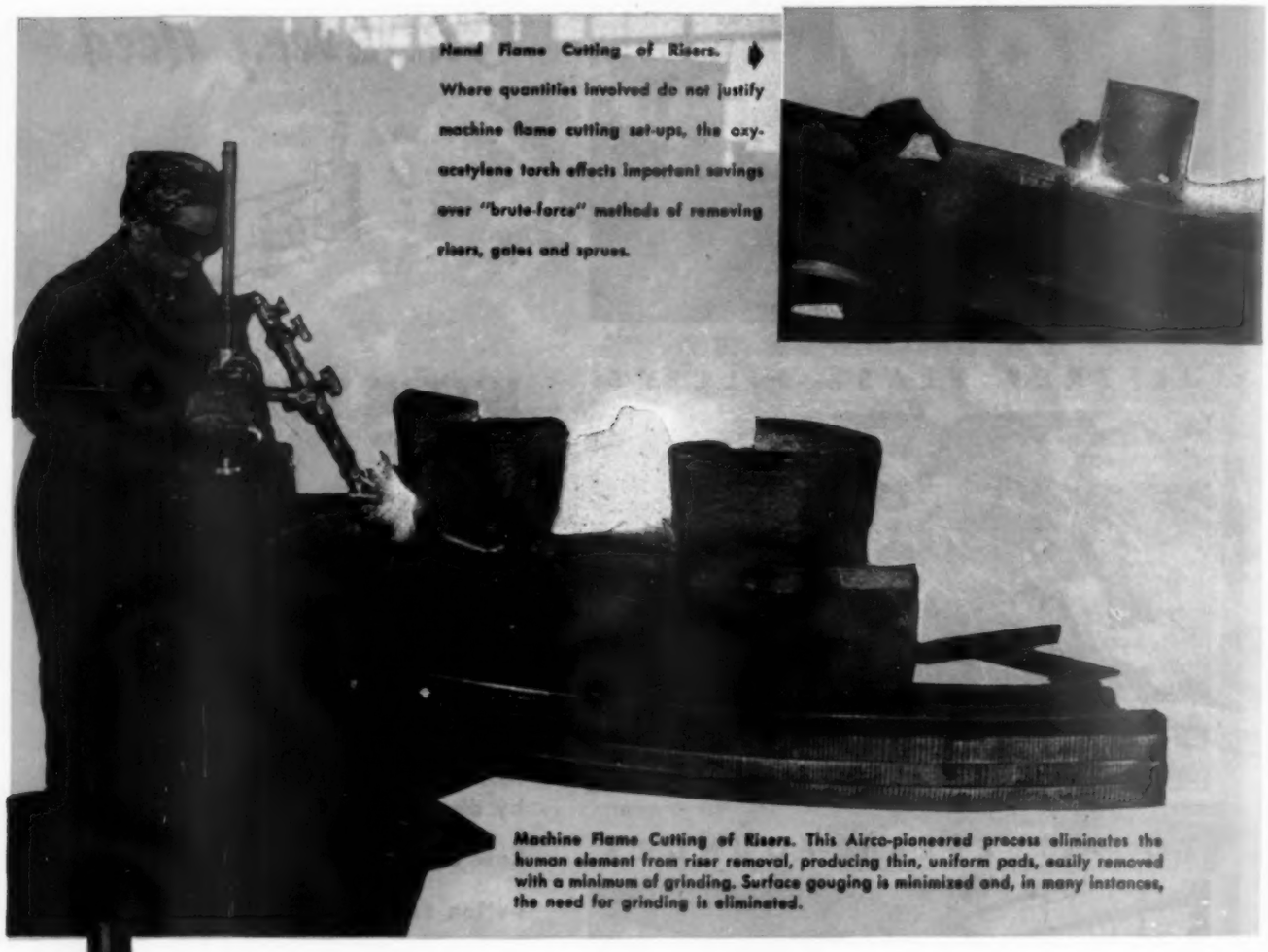
Airco Processes Help to Set



Hand Flame Cutting of Risers. Where quantities involved do not justify machine flame cutting set-ups, the oxy-acetylene torch effects important savings over "brute-force" methods of removing risers, gates and sprues.

Machine Flame Cutting of Risers. This Airco-pioneered process eliminates the human element from riser removal, producing thin, uniform pads, easily removed with a minimum of grinding. Surface gouging is minimized and, in many instances, the need for grinding is eliminated.

Thoroughly familiar with foundry operations through long years of service to the industry, Airco engineers have worked unceasingly to develop better methods of performing operations recognized as bottlenecks in steel casting production. From this work have come new and improved practices which helped foundries set new production records and which point the way to more profitable operations.

These processes, illustrated here, and others such as flame hardening, maintenance welding and hardfacing of equipment subject to wear, are described in detail in the booklet "New and Improved Oxy-acetylene Methods for Steel Foundries". Copies may be obtained by filling in and mailing the coupon on the left. Send for your free copy today.

Airco's Technical Sales Division will be glad to assist you in applying these modern methods to your own foundry operations. 'Phone or write the Airco field office nearest to you.

F

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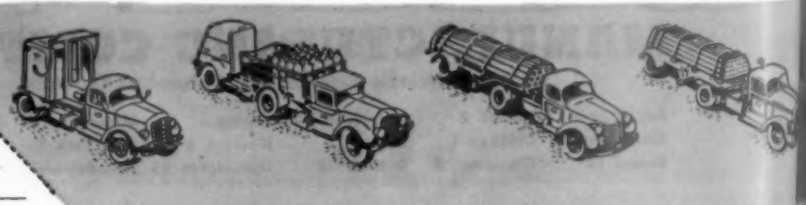
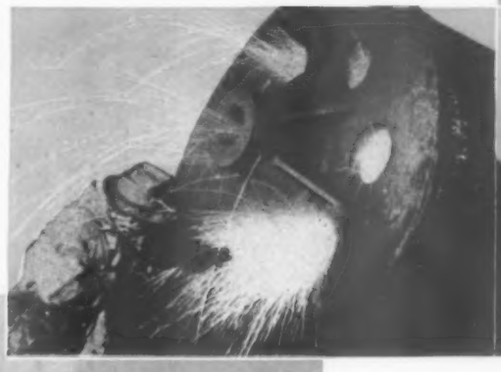


New Casting Production Records

◀ **Flame Scarfing Riser Pads.** This new Airco-developed process burns off riser pads fifty times as fast as they can be removed by grinding — half again as fast as they can be "washed away" with the carbon arc. It produces a superior surface and can be controlled within 1/16" depth.

◀ **Flame Gouging.** Another new Airco oxy-acetylene process, removes webs and fins and gouges out defects in a fraction of the time required for chipping.

Oxygen Lancing. A ▶ faster, more economical method of tapping furnaces, cupolas and ladle nozzles, and cutting up ladle skulls, spills and heavy scrap for remelting.



◀ **Flame Descaling.** This new Airco process descales normalized or annealed castings in one-fourth the time required with the chipping chisel — and produces a cleaner surface.

◀ **A.C. Arc Welding.** This modern method quickly and smoothly fills in cavities left in castings after defects have been gouged out.

AIRCO PROCESSES FOR NON-FERROUS CASTINGS

Heliwelding — The welding arc is enveloped in an atmosphere of helium, eliminating the need for corrosive fluxes and facilitating the welding of aluminum and magnesium. **Nitrogen Fluxing** reduces pin point porosity and produces uniform, high-grade aluminum. There is no loss of magnesium in aluminum-magnesium alloys; no toxic fumes.

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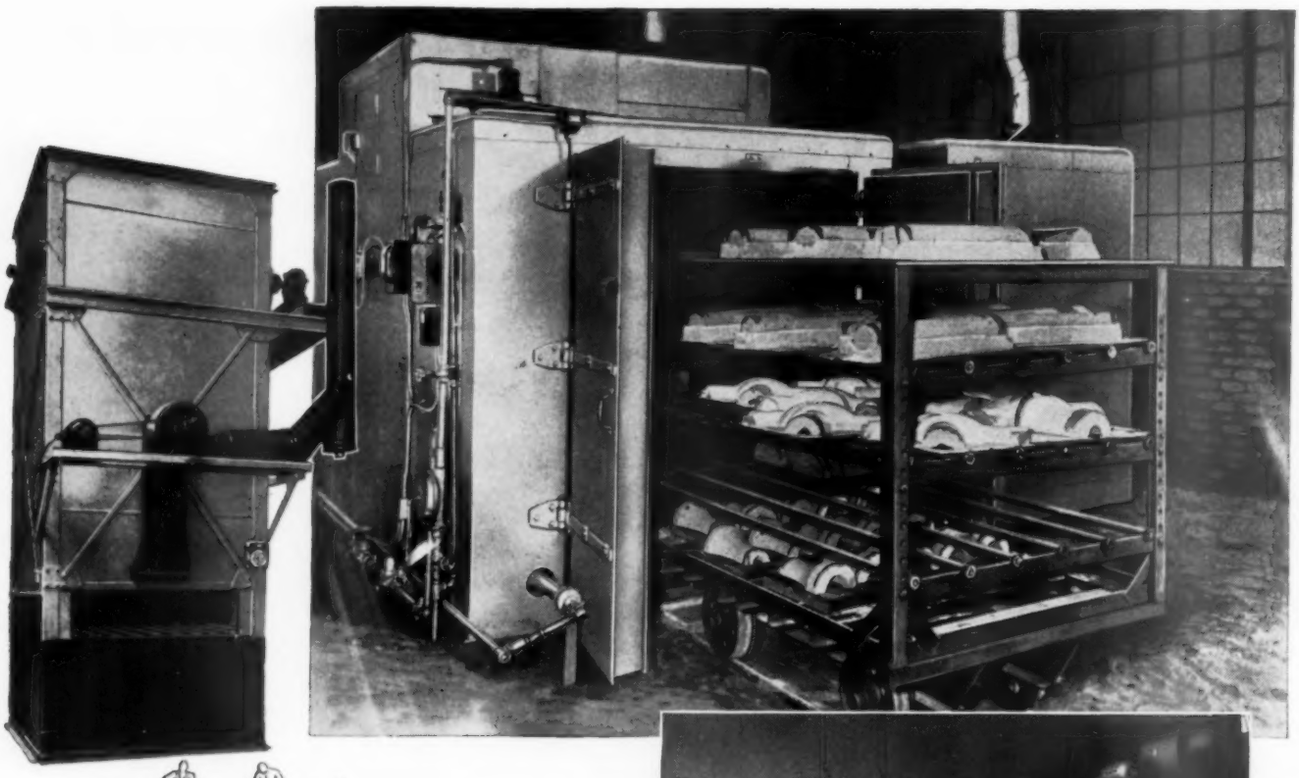


Experience

IS THE REAL BUILDER

OF **SUCCESSFUL FOUNDRY OVENS**

Young Brothers' engineering staff offers foundrymen forty years' accumulated experience in the manufacture of continuous core ovens.

This time-proved know-how can be measured in profit dollars and cents, for it is the greatest single factor in the fabrication of efficient industrial ovens.

MEMBER

Lowered fuel costs, low operating costs, higher production, more satisfactory molds and cores and greater oven versatility are all direct results of engineering skill. These factors must be *designed* into the oven and cannot be produced in a poorly engineered oven by any amount of adjustment short of complete redesign.

The economy of Young Brothers' original design is proved by thousands of successful oven installations.

One Young Brothers' customer writes, "Our cost sheet shows your oven is saving us money. We are fully satisfied." Another says, "Your oven is doing a swell job." Still another writes, "... and your oven has cut our unit costs."

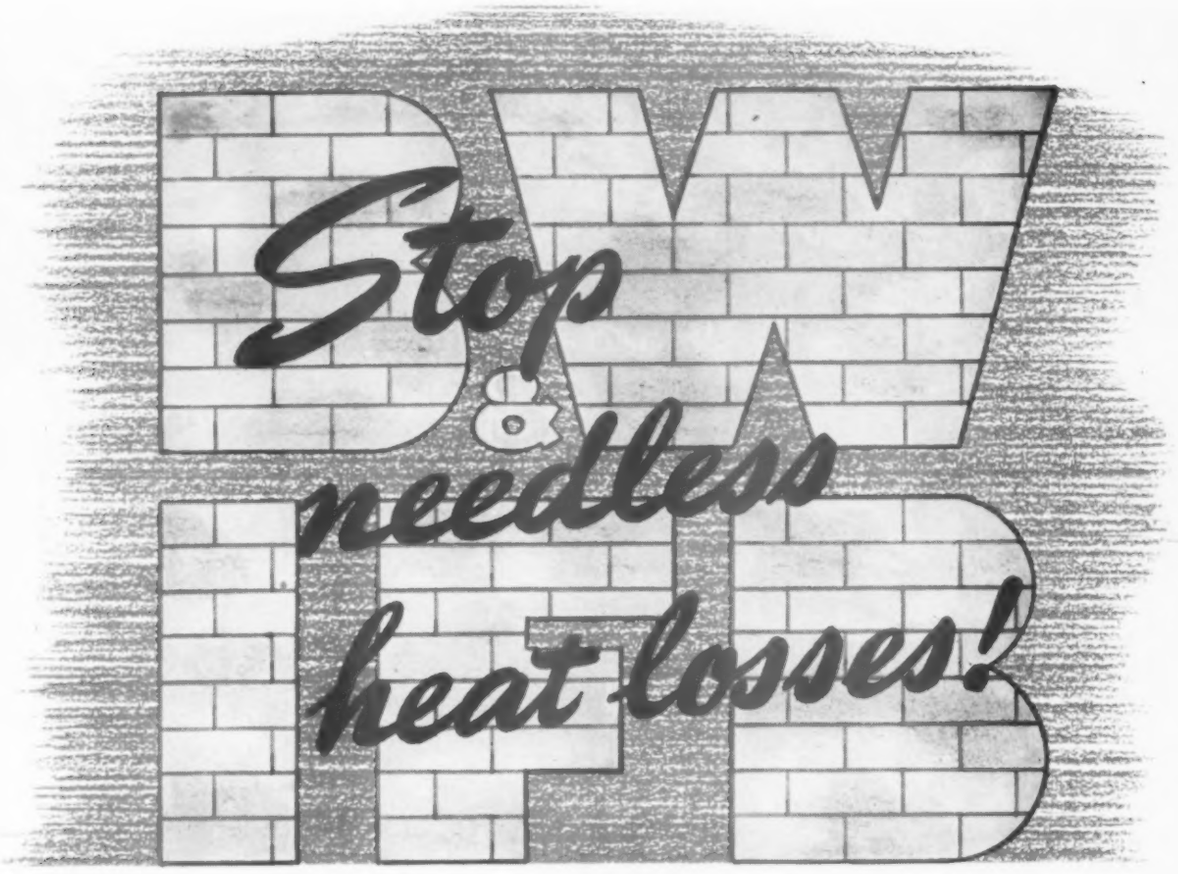
Present-day competition makes imperative low cost production. Young Brothers' engineering staff will help you attain it.

YOUNG BROTHERS COMPANY

6508 MACK AVENUE **DETROIT 7, MICHIGAN**

YB Co

ESTABLISHED IN 1896



Many foundries are incurring needless heat losses by lining their malleable annealing ovens with heavy, dense firebrick . . . losses that can be eliminated through the use of B&W Insulating Firebrick.

When annealing ovens are lined with B&W I.F.B. Foundry Engineers have:

1. Cut heating-up time 60-70 per cent.
2. Reduced fuel costs per ton of castings annealed 33 per cent.

This is because B&W I.F.B. boast exceedingly low heat-storage capacity . . . reduce heating-up time . . . thereby decreasing the overall cycle.

Also heat-waste is cut to a minimum because B&W I.F.B. transmit only a fraction of the heat conducted by ordinary, dense firebrick. Heat is therefore kept in its place where it can do useful work.

What's more . . . B&W I.F.B. have the lightest weight and highest load-bearing capacity of any refractory in their class. Therefore, your furnace construction can be made lighter, reducing foundation and buckstay costs.

If you have a "money-eating" refractory problem, your local B&W Refractories Engineer can help you to learn of the proved profit-building possibilities of B&W I.F.B. A call or a post-card will bring him . . . without obligation.

R-230

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

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ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

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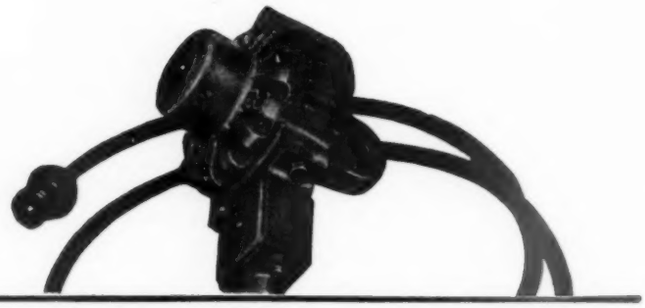
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL

$175.00 f.o.b. Chicago — complete with cable, safety ground wire, one sieve (2-4 mesh). Standard 1/3 h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.



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True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work **$10.00**	No. 5—Heavy match plate, tub, bench **$17.00**
No. 2—Medium match plate **13.00**	No. 9—Machine and heavier **24.00**

FOUNDRY SUPPLIES MANUFACTURING CO.

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CABLE ADDRESS: "ROTOPLANE CHICAGO"

Ship to—
Nearest Foundry
desiring:
1. Increased mold production.
2. Lower unit mold cost.
3. Molds that produce perfect castings.
4. Lowest operating and maintenance cost.
MOLDING HERMAN MACHINES
HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

At country's largest magnesium fabricating plant

REVERE COPPER AND BRASS INCORPORATED uses GAS for melting

In the largest plant in the country devoted to the fabrication of magnesium products—the Halethorpe Extrusion unit of Revere Copper and Brass Incorporated, at Baltimore—Gas is proud to have been chosen for the initial job on the production line—melting the magnesium. Other important heat treating operations throughout the plant are also assigned to Gas.

Six melting furnaces, employing the ultra-modern development, the ceramic Gas burner, are used. Each furnace utilizes thirty Gas burners, temperatures ranging from 1350° to 1500° F. The pot, which sits inside each furnace shell, holds a charge of about 4,000 pounds.

For melting and other operations in the foundry, Gas is unsurpassed. The speed, accurate controllability, economy and cleanliness of this modern industrial fuel are appreciated by metals fabricators. The Industrial Engineer of your local Gas Company can tell you what a better job modern Gas equipment will do for you.

AMERICAN GAS ASSOCIATION

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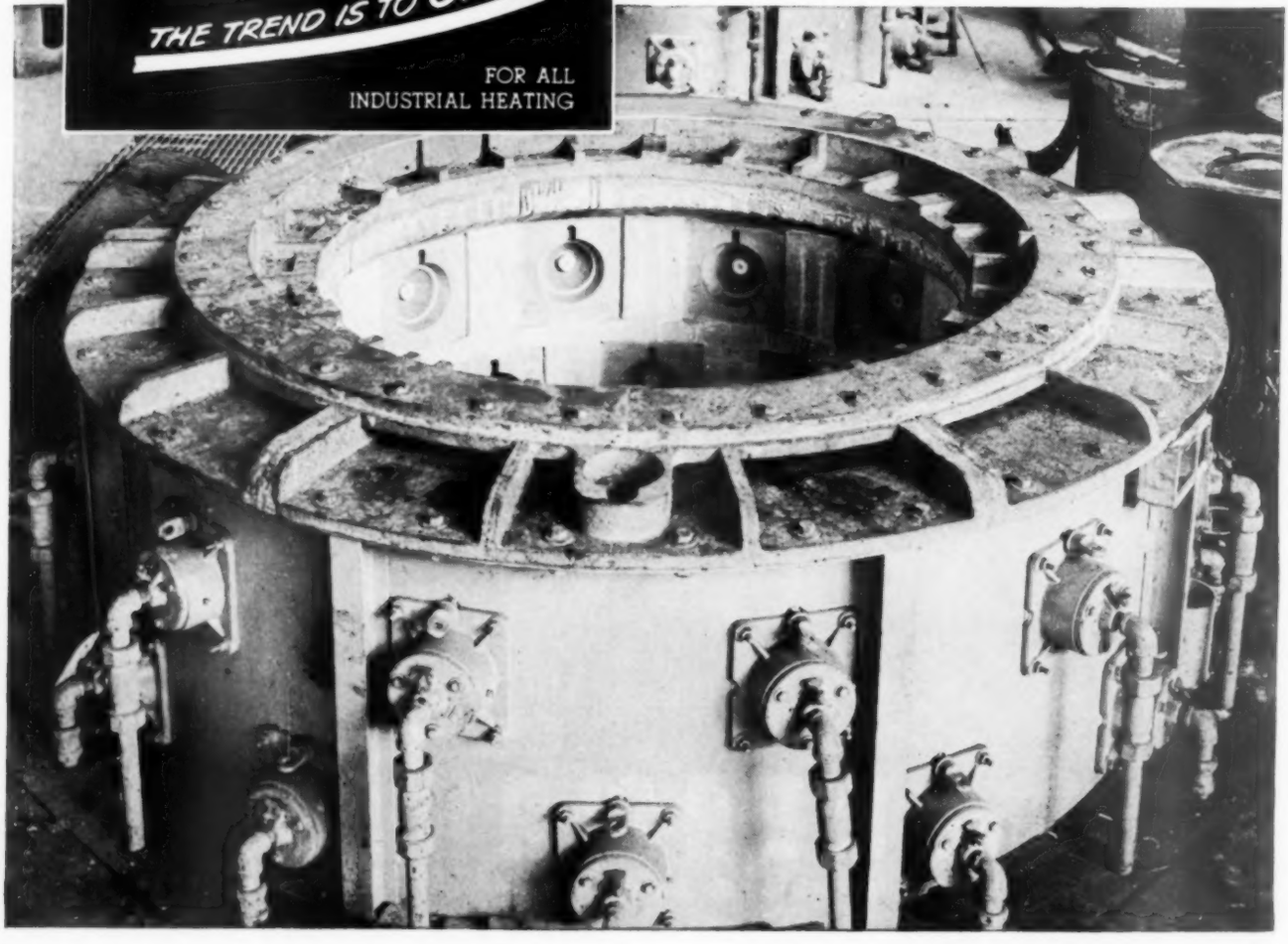
THE TREND IS TO GAS

FOR ALL INDUSTRIAL HEATING



You can have better quality castings in less time at lower cost with modern

DAVENPORT MOLDING MACHINES

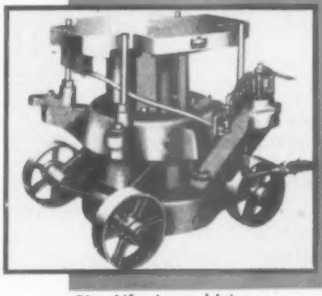
Increases Casting Production

Jolt Rollover Draw
No. 34 Model A

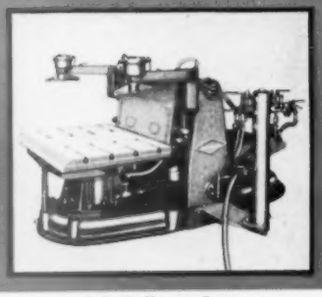
Davenport Modern Molding Machines are easy to install—simple to operate —sturdy in construction with low maintenance cost—and positive in action.

They will pay their way in either a job or line production foundry, casting steel, malleable, gray iron, magnesium or other non-ferrous metals.

Send for our catalog.



Pin Lift (portable)
No. 24 Model AJS



Jolt Rollover Draw
No. 34 Model SA

DAVENPORT MACHINE AND Foundry Company

DAVENPORT IOWA U. S. A.

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!

Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.

You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

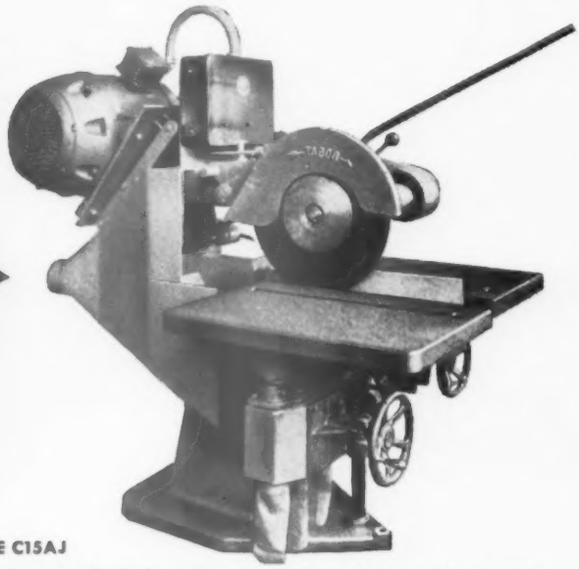
DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 Richmond, Indiana

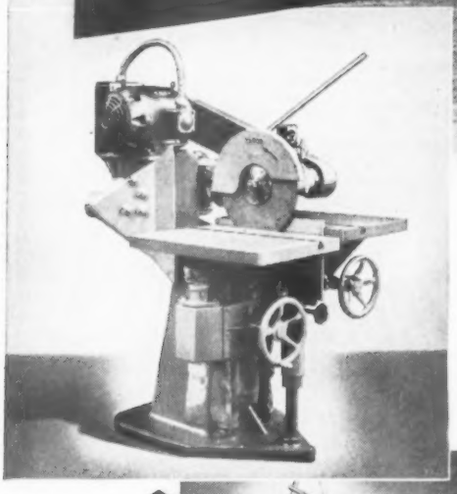
Designers of CORE PLATES, JACKETS, BANDS, FLASKS since 1889

now in the TABOR-BRASIVE *Cutoff* line

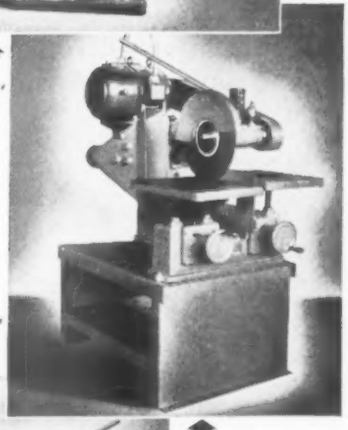


TYPE C15AJ

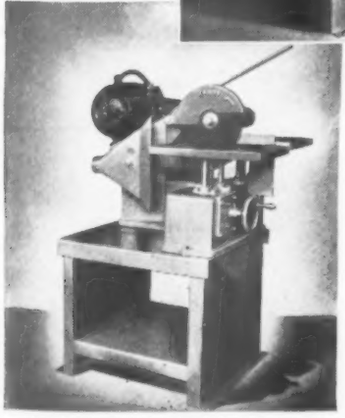
20" diameter wheels driven by a 15 HP 2-speed motor. Longer reach, more offset and greater chopping motion than on the Tabor C10AF. Wheel speed can be increased when the wheel wears to 17" diameter.



TYPE C10AF
Wheel Diameter 16"



TYPE D5AC
Wheel Diameter 14"



TYPE B7½AC
Wheel Diameter 16"

MEMBER

• Tabor-Brasive Cutoff production economies are such that users frankly say they could not have met war production requirements without them. If you produce the various non-ferrous alloys now demanded, you should consider the use of this machine. Remember, too, that Tabor-Brasive Cutoff Machines are not confined to the non-ferrous field. Equally startling results are obtained by users in cutting steel gates and risers; even some alloy iron is cut to advantage. Actually, the list of Tabor-Brasive users is a "Who's Who" of the leading foundrymen of America.

There is a Tabor-Brasive Cutoff Machine for every foundry cutting need. They are built in a complete range of sizes and types, and can also be furnished to meet special requirements. Write for information, giving details of your cutting problems.

If your answer is "Yes" to any of the following questions, you need a Tabor-Brasive Cutoff Machine:

Non-Ferrous Foundrymen—Do you require one man to cut off gates and risers?

Steel Foundrymen—Do you require one man to cut off gates and risers of 3-square-inch cross-section?

Grey Iron Foundrymen—Do you have difficulty in removing gates and risers from special alloy castings?

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Representatives: Snyder Foundry Supply Co., Los Angeles, Calif.; Daniel Gallagher T. M. & R. Co., San Francisco and Oakland, Calif.; Carl F. Miller & Co., Seattle, Wash.

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ECONOMY ALL THE WAY...

IN ENGINEERED ALUMINUM CASTINGS

EXPECT unusual economy in Acme Aluminum Castings . . . all the way from low-cost handling, through rapid machining to reduced transportation charges. Expect better satisfied customers, whose economy you promote with parts or products that serve long and capably.

In Acme Castings expect all the advantages native to aluminum. And more . . .

Acme Castings are *engineered* in detail. This engineering starts with the alloy precisely suited to the job and, knowing the use to which the finished part will be put, it *builds in* design refinements for maximum strengths. Dead metal is fully minimized; thus machining time and costs are reduced.

You can pre-prove the values in Acme engineered economy, without obligation. Send us your blueprints and other information on any casting problem. Acme engineers will analyze them and offer recommendations.

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Patterns · Tools · Aluminum, Brass, Bronze Castings · Engineering

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An Open Letter to President Truman

National Conference of Business Paper Editors held an off-the-record talk with President Truman on Friday morning, Jan. 11. That evening four of the editors, including the editor of THE FOUNDRY, addressed "Open Letters to the President on Reconversion Problems" in a coast-to-coast broadcast over the Columbia Broadcasting System. The following letter on foundry reconversion problems was broadcast by Frank G. Steinebach:

WHY are castings, made in foundries, vital to our economy? And what can your administration do, Mr. President, to increase production?

Castings are vital because all of the necessities and luxuries of life either are made of castings or are produced on machines having many cast parts. Machines that work for us, such as those that weave our clothes and process our foods, are built of castings. Our automobile has a cast engine and numerous other cast parts, as do trains, airplanes, trucks, home appliances, water work systems, and thousands of other items in daily use.

Since the end of the war, many foundries have been unable to meet the tremendous demand for castings to be used in building civilian machines and products. As a result, manufacturers frequently tell the buying public that their products are not available because castings cannot be purchased.

Why are foundries unable to supply enough castings for reconversion?

First, the demand probably exceeds the entire plant capacity of the industry.

Second, foundries cannot secure sufficient skilled and semiskilled workers, so that many plants are working at only 50 to 60 percent of capacity.

Third, government controls and restrictions prevent foundries from doing a better job.

If foundries are to increase production, attention must be given to the following developments:—

(1) Government controls must be kept at a minimum.

(2) The OPA must see that ceiling prices on castings include the cost of production and a fair profit. Base prices frequently do not cover production costs. This results in movement of patterns for making castings from one plant to another, and hampers production.

(3) The Army and Navy should discharge skilled foundry workers where such men are not essential to the services, and where suitable application has been made by the foundry.

(4) Government should see that men out of work are directed to foundries and other industries needing them. They should not be paid for continuing to loaf in the face of unlimited job opportunities—a condition, Mr. President, prevailing in many industries, such as textiles, building and elsewhere.

(5) Every effort should be made nationally and locally to increase foundry employment.

Until these steps are taken, Mr. President, we cannot get new automobiles, refrigerators, laundry machines, and thousands of other items in abundance, nor the machines on which these and countless other consumer goods are manufactured. If production is to smother the danger of inflation, the foundry industry must get the green light.

During the last three years the foundry industry has spent millions of dollars to mechanize operations and modernize working conditions. Since the war, additional millions have been earmarked for the same purpose.

Wages paid to foundry workers are well above the general average of all industry. Employment is steady.

Today, foundries offer an exceptional opportunity for men who want jobs with a future.

NONFERROUS COST ACCOUNTING

INTRODUCTION... This is the first of two installments detailing the "Simplified Accounting Procedure and Cost Methods" developed by the Non-Ferrous Founders' Society and reproduced here through the courtesy of that organization.

During the late war, with government control of both production and prices of product, a greater appreciation of costs and cost methods was developed by members of the industry. Consequently, the Non-Ferrous Founders' Society appointed a cost committee with the definite assignment of preparing a "simplified method of cost accounting." The resulting manual was developed with the double purpose of attaining the industry's maximum contribution to the war effort and of providing the data essential for better controls and more profitable operations.

The society points out that it would be obviously impossible to set up and expect adoption of a simplified method for all types of establishments. However, some records must be kept by all; most of these were or are required by governmental controls, while others are fundamental to good sound business practice. These latter fundamentals are the ones dealt with here.

The manual is not presented with the idea that it is a static vehicle, but with the understanding that it represents the least common denominator of accounting practice acceptable today, and that from time to time additions necessarily will be required.

Members of the society's cost committee which prepared the manual are: Chairman, L. M. Nesselbush, Falcon Bronze Co., Youngstown; Oscar W. Swangren, Dorchester Brass & Aluminum Foundry Inc., Hyde Park, Mass.; John M. Baird, Shoop Bronze Co., Tarentum, Pa.; O. E. Burns, Model Brass Co. Inc., Decatur, Ill.; Joseph J. Mayer, Lumen Bearing Co., Buffalo; L. M. Zimmerman, consultant, McClure, Hadden & Ortman Inc., management engineers, Chicago.

EXHIBIT "A"

"X" COMPANY

BALANCE SHEET

DATE 10-31-44

ASSETS		
CASH	$ 600.00	
INVENTORIES	$ 400.00	
RECEIVABLE (Accounts and Notes)	$ 555.00	
LANDS and BUILDINGS	$ 1,500.00	
MACHINERY and EQUIPMENT	$ 500.00	
TOTAL ASSETS		$ 3,555.00
LIABILITIES		
CAPITAL STOCK	$ 1,000.00	
PAYABLE (Accounts and Notes)	$ 2,000.00	
RESERVES TAXES	$ 10.00	
RESERVES OTHER	$ 292.83	
SURPLUS	$ 252.17	
TOTAL LIABILITIES		$ 3,555.00

THE accompanying Balance Sheet form (Exhibit *A*) is characteristic of the simplest kind that would adequately present the *"Statement of Conditions."* It also is satisfactory in meeting the requirement of OPA for use in filing their forms—for securing price adjustments.

The nature of a Balance Sheet is static and does not denote activity. It is a "picture" of business *at rest*, and could not portray the condition of business for any given period. Rather it shows the condition *at a certain date* (theoretically a certain time) and tells nothing of the transactions leading up to that condition.

This presentation is necessarily elemental. What appears to some to be in that vein might be to others essential and helpful. We have developed therefore, a hypothetical Balance Sheet for "X Company," a typical foundry, operating a business in Class 'E" or "F" bracket

SHEET NO. 1 — EXHIBIT "B" — ACCOUNT NO. 10

NAME OF ACCOUNT—CASH

DATE 1944	EXPLANATION	Posting Reference	DEBITS	√	CREDITS	√	BALANCE DEBIT	BALANCE CREDIT
	OPENING ENTRY		1,000.00				1,000.00	
10/1	To Purchase Land and Building	GL. 13			300.00		700.00	
10/2	To Purchase Machinery and Equip.	GL. 14			100.00		600.00	
10/10	Payroll				270.00		330.00	
10/15	Purchases				300.00		30.00	
10/16	Cash from Sales		500.00				530.00	
10/18	Payroll				270.00		260.00	
10/20	Purchases				200.00		60.00	
10/24	Cash from Sales		500.00				560.00	
10/25	Payroll				270.00		290.00	
10/28	Cash from Sales		1,445.00				1,735.00	
10/31	Purchases				1,135.00		600.00	

SHEET NO. 2 — EXHIBIT "C" — ACCOUNT NO. 13

NAME OF ACCOUNT—LAND AND BUILDING

DATE 1944	EXPLANATION	Posting Reference	DEBITS	√	CREDITS	√	BALANCE DEBIT	BALANCE CREDIT
10/1	Full Description of Property Purchased and Terms	GL. 10	1,500.00				1,500.00	

SHEET NO. 7 — EXHIBIT "D" — ACCOUNT NO. 21

NAME OF ACCOUNT—NOTES AND ACCOUNTS PAYABLE

DATE 1944	EXPLANATION	Posting Reference	DEBITS	√	CREDITS	√	BALANCE DEBIT	BALANCE CREDIT
10/1	12 Serial Notes of $100 Each, Due "Y" National Bank—Annually 10/1/45 to 10/1/56				1,200.00			1,200.00
10/2	8 Deferred Payments of $50 Each Due "Z" Company—Monthly 11/2/44 to 6/2/45				400.00			1,600.00
10/3	Purchase "B" Company				400.00			2,000.00

SHEET NO. 9 — EXHIBIT "E" — ACCOUNT NO. 23

NAME OF ACCOUNT—RESERVE LIABILITY OTHER

DATE 1944	EXPLANATION	Posting Reference	DEBITS	√	CREDITS	√	BALANCE DEBIT	BALANCE CREDIT
10/31	Accrued Payroll				180.00			180.00
10/31	Interest on Building Note				5.00			185.00
10/31	Reserve for Note Retirement				8.33			193.33
10/31	Interest on Machinery Payment				2.00			195.33
10/31	Payment on Machinery				50.00			245.33
10/31	Vacation Fund				22.50			267.83
10/31	Insurance Reserve—Building				10.00			277.83
10/31	Insurance Reserve—Manager				10.00			287.83
10/31	Reserve for Inventory Loss				5.00			292.83

for the purpose of illustration. The basic primitive transaction leading to this Balance Sheet will be followed and explained by using accepted accounting practices.

At the beginning of business the company (or individual) has set aside for this venture $1000.00 in cash. This act as related to the Balance Sheet created a company "asset," but as the name Balance Sheet implies, it is the implement used to keep, by accounting records, all transactions in balance. To complete the balance therefore we would have $1000.00 in capital as a "liability." This simple transaction would be presented as follows:

Assets

Cash $1000.00

Liabilities

Capital $1000.00

There are two records—"assets" recording the values *owned*, and "liabilities" the values *owed*. The principal fundamental to be observed is that *the equation must always be kept in balance.*

From this simple beginning let us now assume the "X Company" found suitable land and buildings for its operation. The price for this property was $1500.00, but the company by negotiation was able to secure it with a down payment of $300.00 and a series of notes due annually on the unpaid balance.

With this additional transaction the Balance Sheet would have to be changed for "X Company" as follows:

Assets

Cash ..... **$ 700.00**
Land and Buildings **1500.00**

Total **$2200.00**

Liabilities

Capital	$1000.00
Notes Payable	1200.00
Total	$2200.00

How would the transaction be recorded? In the "old days" the only media would probably be a cancelled check for $300.00 in one hand and twelve serial notes for $100.00 each in the other. Of course, owners and operators of an enterprise in this bracket might contend that they have a "one-man" business and that the keeping of any records can be classed as unnecessary "red tape." There is a certain fallacy in that kind of statement, as we know that the complexities of today's tax requirements have made necessary the keeping of some essential records, and that regardless of the type and kind of records kept, the foregoing transaction must be kept in file, referred to periodically and even though the time spent on this particular one might seem to be of no importance, the same time *or less* would have handled the transaction in approved accounting practices, and there would exist a permanent record which would provide proper controls for improved current operation.

The point we are stressing is that because we use the word "records" we do not suggest the setting up of an elaborate system that requires the "full time" of some employee on clerical effort, nor does it imply the use of outside professional help on an annual fee basis to get this work done. What we have in mind is that for the effort now spent, whether it be only a few minutes per day or a few hours per week, it is possible to secure the benefits attendant with following sound accounting principles by the employment of just a few of these practices.

We come, therefore, to the selection of a simple method of handling this type of transaction. The posting of entries is kept in a General Ledger, with a separate sheet maintained for each of the accounts listed on the Balance Sheet. Of course, there are many types of General Ledgers used. We are not so much concerned with the type and kind used, as long as there is one existent, and if not, to show any individual or company the most expedient way to set one up.

The accompanying samples (Exhibit *B*, *C*, and *D*) utilize a standard loose-leaf ledger sheet, some form of which is available at almost any office equipment store, or it can be obtained from the Non-ferrous Founders' Society's office together with a suitable binder at a very nominal cost. It also shows the method of recording permanently the land and building purchased by "X Company" in great enough detail that further comment would be needless.

"X" COMPANY

EXHIBIT "B"

PROFIT AND LOSS STATEMENT

Period Ending October 31, 1944

Gross Sales Billed				$ 3,120.00
	BRASS	ALUMINUM	MAGNESIUM	
Sales	$2,007.00	$1,113.80		
Pounds	7,000	2,350		
Returns and Allowances				$ 120.00
Net Sales Billed				$ 3,000.00
Cost of Sales Billed				$ 2,625.00
Operating Profit				$ 375.00
Other Income				$ 30.00
Other Deductions from Income				$ 152.83
Net Income				$ 252.17
Provision for Federal Income and Excess Profits Tax				$
Earned Surplus and or Profit				$ 252.17
Percentage of Profit or Loss				$ 8.1%

Suppose now that "X Company" is able to secure for the building the other necessary machinery and equipment before starting operations. This was purchased at a cost of $500.00, with $100.00 being paid in cash and deferred payments arranged on the balance.

The Balance Sheet to show this condition would have to appear as follows:

Assets

Cash	$ 600.00
Land and Buildings	1500.00
Machinery and Equipment	500.00
Total Assets	$2600.00

Liabilities

Capital Stock	$1000.00
Notes Payable	1600.00
Total Liabilities	$2600.00

This purchase would affect the General Ledger by the simple addition of one sheet to cover the new type of asset that had been created, namely *Machinery and Equipment* for the full amount of the purchase, the same kind of record that was made previously for the *Land and Building* account as shown on Exhibit *C*. The balancing of the accounts to maintain the equation to finish this step would be to credit *Cash* for the $100.00 down payment which is shown as the second entry on Exhibit *B* and also making a credit entry on the *Notes Payable* sheet for the $400.00 still owed and shown as the second entry on Exhibit *D*.

The fundamental rule that governs making entries on General Ledger sheets for assets and liabilities is (a) an asset is increased by a debit and decreased by a credit; therefore, all opening entries on assets are debit balances for *values owned* (b) a liabilty is increased by a credit and decreased by a debit, and all opening entries on liabilities are credit balances for *values owed*. This principle is also portrayed in "Exhibits *B*, *C*, and *D*."

Up to this point we have been dealing with the creation of the kind of assets classed as "Property Accounts" and they are of a "fixed" nature. These, therefore, are called "Fixed Assets" and, because negotiations and time are required to convert them into money for debt paying, are of opposite qualities from the other Balance Sheet items.

"X" Company is now ready to purchase materials and supplies to start operation. These are available through a local supply house, and therefore large inventories of raw materials and supplies will not have to be carried and only a minimum expenditure is necesssary. Let us assume, however, for the condition of this problem that $300.00 of raw metals are needed and $100.00 in sundry supplies of all kinds. On this bill the supply house terms are net 30 days and the Balance Sheet would appear at this point as follows:

Assets

Cash	$ 600.00
Inventories	400.00
Land and Buildings	1500.00

EXHIBIT "G"

SALES AND DISTRIBUTION

	MONTH OF OCTOBER		BRASS		ALUMINUM		MAGNESIUM		TOTAL SALES
			POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	
10/5	"B" COMPANY	1	500	150.00					150.00
10/7	"C" COMPANY	2			275	110.00			260.00
10/8	"B" COMPANY	1	700	196.00					456.00
10/11	"D" COMPANY	3	200	80.00					536.00
10/10	"C" COMPANY	2			400	200.00			736.00
10/10	"D" COMPANY	3			100	38.00			774.00
10/10	"E" COMPANY	4	100	26.00					800.00
10/12	"B" COMPANY	1	500	150.00					950.00
10/12	"E" COMPANY	4	200	52.00					1,002.00
10/14	"C" COMPANY	2			400	200.00			1,202.00
10/14	"F" COMPANY	5	50	28.00					1,225.00
10/15	"B" COMPANY	1	800	240.00					1,465.00
10/15	"D" COMPANY	3	300	120.00					1,585.00
10/17	"D" COMPANY	3			500	250.00			1,835.00
10/17	"H" COMPANY	6	1000	240.00					2,075.00
10/20	"C" COMPANY	2			400	200.00			2,275.00
10/22	MR. "W" Cash				25	15.00			2,290.00
10/24	"B" COMPANY	1	800	240.00					2,530.00
10/26	"H" COMPANY	6	1000	240.00					2,770.00
10/30	"C" COMPANY	2			250	100.00			2,870.00
10/30	"E" COMPANY	4	700	25.00					2,895.00
10/31	"B" COMPANY	1	750	225.00					3,120.00
	TOTALS		7,000	$2,007.00	2350	$1,113.00			$3,120.00

Machinery and Equipment 500.00

Total Assets $3000.00

Liabilities

Capital $1000.00
Notes and Accounts Payable 2000.00

Total Liabilities $3000.00

It may be reasoned that sundry supplies are not properly a part of inventory considered as an asset; that rather they are chargeable to current operations. Since it is not our intention to take sides on controversial points, we must pass this up at this time by saying that it does not make any difference which method is employed as long as the practice followed is used consistently.

Of course our Balance Sheet is not yet complete. We have remaining on the "asset" side *Receivables* and on the "liabilities" side *Reserves* and *Surplus*. These accounts are usually inactive unless there has been some plant activity. In order to complete our exhibit it will be necessary to give a brief explanation of these accounts and what entries are made on these Ledger sheets.

We now have a plant that is ready to begin operation, and the first requirement will be sales orders and concurrently the selecting and placing of employees. At this time then, we create by sales a *Notes or Account Receivable* account, unless of course you were able to have all your accounts prepaid on receipt of order or paid for on delivery, which we think would be very rare in this type of industry.

The accounting procedure attendant to "sales" does not properly come under the scope of the Balance Sheet requirement discussion, but rather under "Profit and Loss Statement" which will be fully explained and illustrated in the succeeding section of this manual. We must let it suffice at this time and for the purpose of our illustration that an entry on the *Receivables* sheet of the General Ledger is the difference between gross sales billed and payments made against these billings.

Let us assume, therefore, that "X" Company at the end of its first month of business had $3000.00 net sales of which $2445.00 had been paid for by the end of the month, leaving a balance of $555.00 still collectible. As a result of operations this entry would appear on the *Receivables* sheet of the General Ledger and our Balance Sheet would appear as follows:

Assets

Cash ..... $ 600.00
Inventories 400.00
Land and Buildings 1500.00
Machinery and Equipment 500.00
Notes and Accounts Receivable 555.00

Total Assets $3555.00

Liabilities

Capital $1000.00
Notes and Accounts Payable 2000.00

Total Liabilities $3000.00

It would be next to impossible (*Please turn to page* 238)

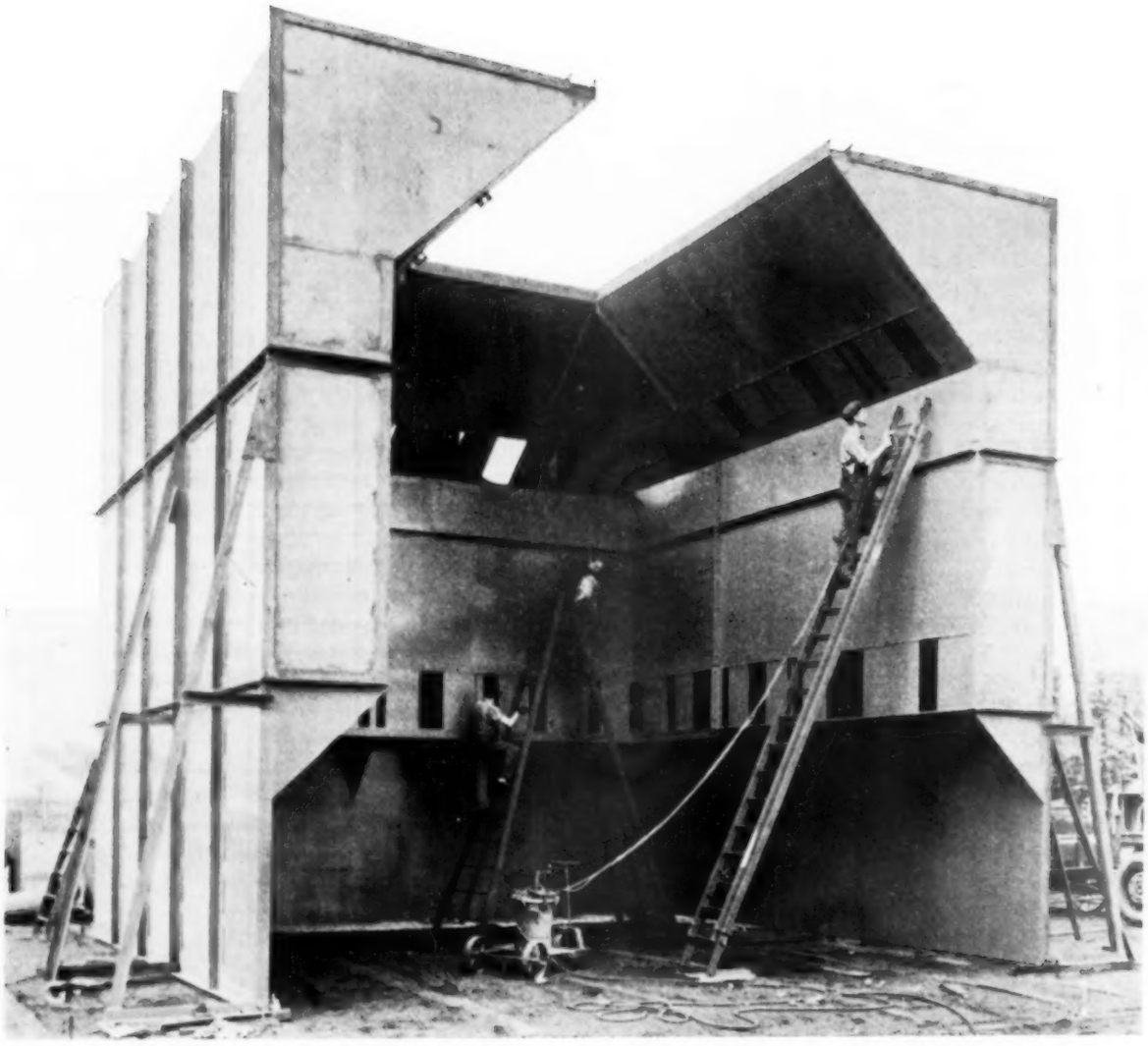


Fig. 1—Side shields on two sides of the shakeout to form a U-shaped enclosure can normally be installed where large shakeouts are exhausted

FOUNDRY

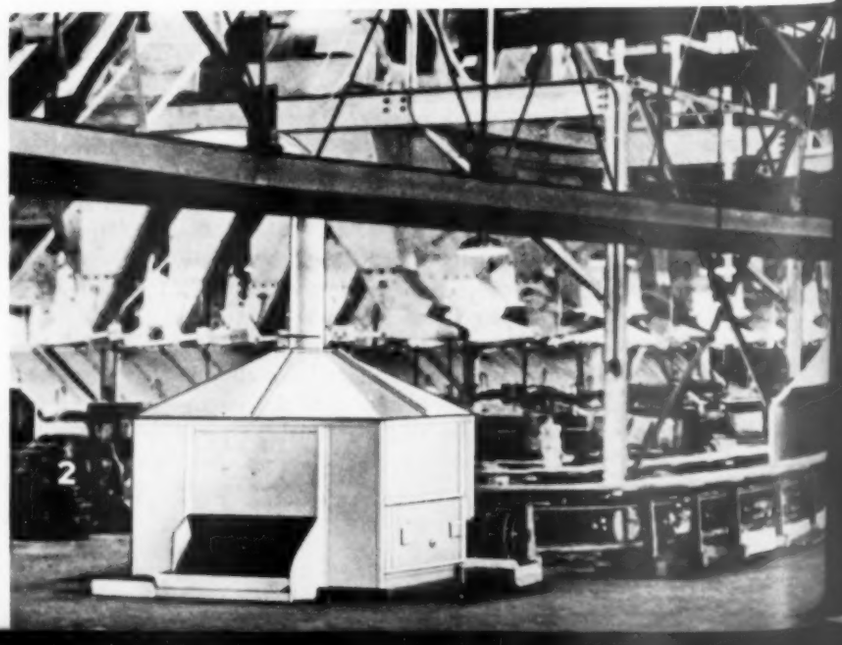


Fig. 2—A complete enclosure for the foundry shakeout is practical where smaller flasks are shaken out

Fig. 3—Complete enclosures can be designed for most makes of tilting brass furnaces

Fig. 4—Local exhaust ventilation attached to the electric melting furnace roof ring prevents dispersion of smoke, fumes and dust to the melting room

Y VENTILATION

By JOHN M. KANE
Chief Engineer
Dust Control Division
American Air Filter Co.
Louisville, Ky.

This is the first of two articles reviewing ventilation requirements in various phases of foundry operations. The text comprises a lecture prepared by the author for an inservice training course, "Environmental Controls for Industrial Processes," at the University of Michigan

IT IS questionable if there is any industry where ventilation of all types, air supply, general ventilation, and local exhaust ventilation is more extensively used than in the average foundry. This is particularly true if comparison is based on cubic feet per minute exhausted per worker. Air is used for the removal of excessive heat, dusts, smoke, and fumes. It has an essential part in maintaining effective sand characteristics for molding and in increasing output from abrasive cleaning and tumbling operations.

In the early history of exhaust systems and local exhaust ventilation, foundries were among the first to exhaust abrasive cleaning equipment, steel electric melting furnaces and brass crucible type furnaces. Foundry buildings were designed to partially release smoke during pouring and, to a certain extent, dust during shakeout by natural ventilation through extensive roof monitors. Introduction of mechanical sand preparation equipment resulted in the foundry industry leading the way in adoption of local exhaust ventilation from conveying, elevating, screening, storing and mixing equipment; this in spite of the extreme variation from foundry to foundry in operations, size of castings and equipment, type of metal and sand requirements.

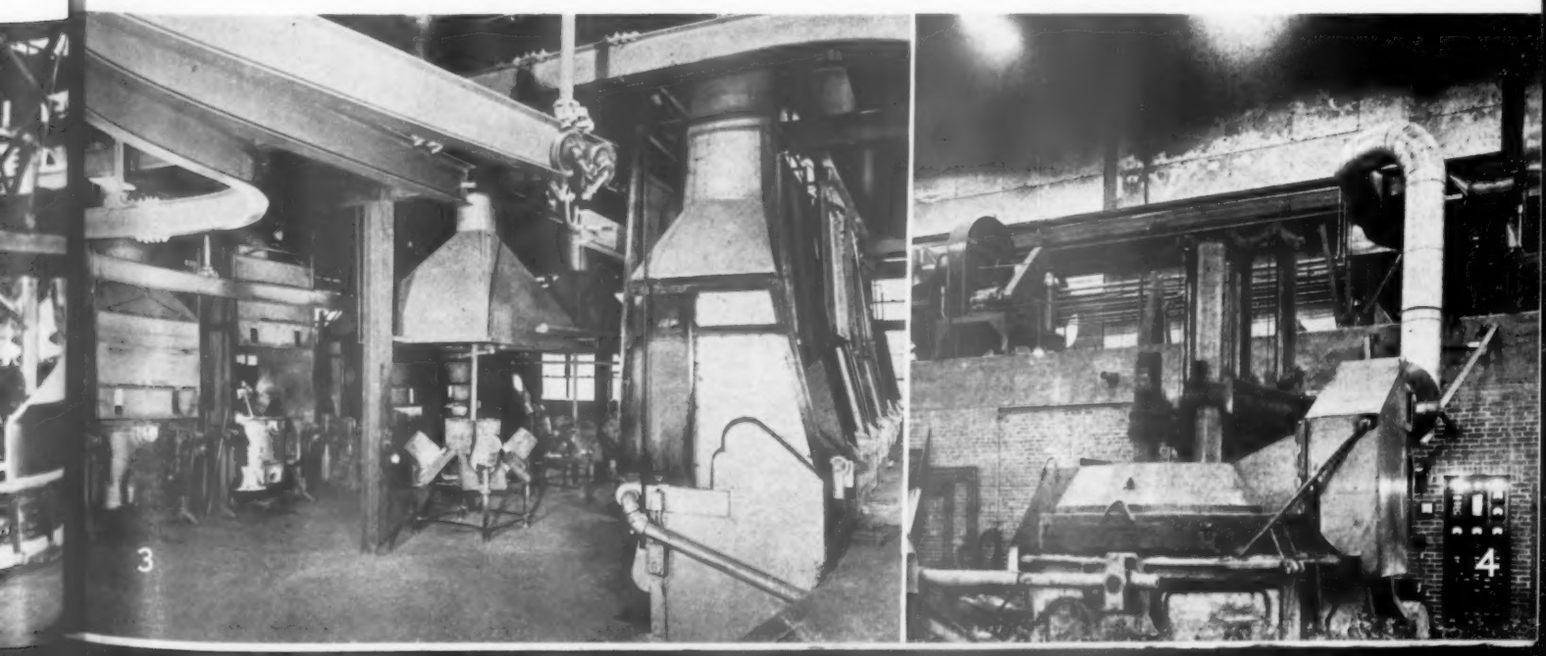
A discussion of the foundry ventilation problem lends itself to a step-by-step following of operations from the pouring of the molten metal in the flask to the final finishing of the casting in the cleaning room. In every case where control of dust, fumes or smoke is involved, the ventilation engineer makes an effort to isolate the operation and apply local exhaust ventilation. Where this system can be used, exhaust volumes will be a small fraction of the air requirements for general ventilation and the results will be more positive and dependable than can ever be obtained by the dilution method necessary in general ventilation practice.

Melting: Ventilation problems during the melting of the metal vary with the metal and the furnace used. Some furnaces, like the cupola for gray iron, reverberatory furnace for brass, and the open-hearth furnace for steel, conduct products of combustion, smoke and fumes to the atmosphere automatically by nature of the furnace design. Problems under such conditions involve only smoke released during pouring and cleaning of the exhausted gases to eliminate nuisance conditions on the outside atmosphere.

Other furnaces, like those in most nonferrous foundries, and the electric melting furnace for steel, release quantities of smoke, fume, and dust to the workroom, requiring exhaust ventilation for their control.

Electric Furnace for Steel Melting: It has been general practice to rely on general ventilation for exhaust of the smoke and fumes from this operation. Exhaust volumes moved through roof ventilators over the melting floor have been in the range of 30,000 to 100,000 cfm per furnace. Even with such volumes exhausted from the area, general ventilation has not proved entirely satisfactory. Visibility of the crane operator has been obscured, and under adverse atmospheric conditions many foundries are filled with a thick haze from the furnace smoke.

A recent application of local exhaust ventilation, Fig. 4, illustrates the advantages of local exhaust ventilation as compared with general methods. By placing a hood on the furnace roof ring, positive control of smoke, dust, and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fumes is obtained at the point of generation, and dispersion to the melting room or foundry proper is eliminated. This positive control is obtained with exhaust volumes of 20 to 40 per cent of the quantities used with less effectiveness by general ventilation methods.

One dust problem in the melting room frequently is overlooked. It is caused by shaping refractory brick usually with an abrasive cut-off wheel. Exhaust ventilation is definitely indicated, and the booth type enclosure, Fig. 9, exhausting 1000 to 1500 cfm is an excellent solution. Where abrasive wheel is moved from place to place within the foundry, a local hood and portable dust collector provides reasonably satisfactory control.

Crucible Furnaces for Nonferrous Melting: Where crucible furnaces are used, natural draft stacks have been the general method employed in exhausting products of combustion, smoke and fumes. Due to the method of charging, melting and pouring, little effort had been made until recently to bring the exhaust stack to within close proximity of the hood. With considerable elevation between hood mouth and furnace top, control has not been too good in many cases, even where volumes of 5000 cfm and higher have been exhausted. Release of smoke and fumes have caused metal fume fever in the brass foundry, and permitted release of sulphur dioxide and fluorides in the magnesium foundry.

Crucible furnaces are of two types—the tilting furnace that tilts to pour the molten metal to a ladle, and the pit furnace where the crucible is removed when the melting cycle is completed. The pit type lends itself to a positive enclosure coming down to the melting floor, with access doors for the removal of the crucible. Positive control is easily obtained at a fraction of the volume required without the tight-fitting hood.

Design Hood for Tilting Furnace

A complete hood for the tilting furnace is a real problem due to the tilting movement during pouring and the swinging top design for charging. A counterweighted telescope hood offers one solution to this application, raising the hood to get necessary clearance for charging and pouring. An inspection and access door or opening in the hood allows stirring and metal addition during the melting cycle without raising the hood, and reducing the effectiveness of the control. However, a more effective enclosure, Fig. 3, is highly desirable and can be designed for many makes of tilting furnaces.

Pouring: Pouring of metal is accompanied by a smoke problem as the metal is poured and during the cooling phase in the flask. In nonferrous foundries, metal fume concentrations in the gases make the problem more than a nuisance consideration.

Where mold conveyors are employed to bring flasks to a central pouring area, control by ventilation is relatively clean-cut. Such ventilation also reduces the excessive heat problem produced by the continuous pouring in a restricted area. After pouring, much of the subsequent smoke and fumes are readily exhausted as the molds pass through the ventilated smoking or cooling tunnel.

Where pouring of molds is done over the molding floor area, the zone of smoke removal is too great for localized ventilation except in the melting area itself. General ventilation of the foundry area is indicated for removal of the contaminants as the molds are filled and the castings cool.

Shakeout and Steel Conditioning: In a mechanized foundry, sand handling and preparation equipment lends itself readily to local exhaust ventilation with very satisfactory control and removal of the generated dust, fumes and steam assured.

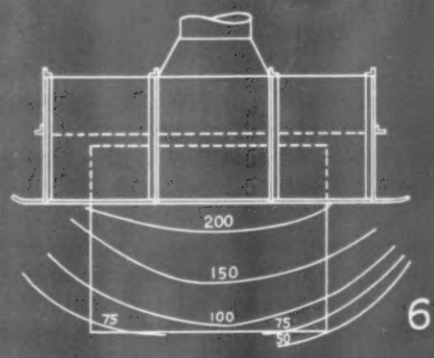
The shakeout and core knockout requires the most study in the application of local exhaust ventilation before degree of enclosure and exhaust volume can be determined. The enclosure will depend on the size of casting or flask and the method of delivering it to the shakeout grate. The three basic methods of dust control for this operation are: 1. Overhead hoods or partial enclosure. 2. Downdraft. 3. Side hoods.

Overhead Hoods are limited to smaller shakeouts where flask can be upset from conveyor to shakeout by hand, or by hydraulic or compressed air ram or flask pusher. Such hoods are modifications of complete enclosures, and once the design is established, required exhaust volume can be determined accurately by the measurement of the total area of openings through which an indraft of 200 fpm must be maintained. A minimum volume of 200 cfm per square foot of shakeout grate area has been recommended to safeguard against insufficient volume where hoods are unusually well enclosed. Under these circumstances, removal of the released gases and steam would not be rapid enough to prevent blow back if volume were selected on the basis of specified indraft only.

Exhaust connection should be at the top of the hood (in direction of dust and steam travel) and normally there will be a casting discharge opening in rear of the feed point, where castings are automatically or manually removed after the operation.

Figs. 2 and 8 show two extremes in overhead hood construction; almost a complete enclosure in Fig. 2 as opposed to considerable open area at the front of shakeout in Fig. 8 to facilitate the manual upsetting of larger, heavier flasks handled at that foundry.

The overhead hood described here should not be confused with the "canopy" design, which is a hood well above the shakeout with no side plates extending to the floor. Such canopy hoods have little (*Please turn to page* 228)



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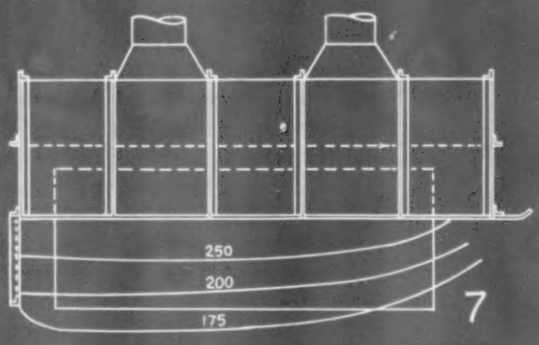

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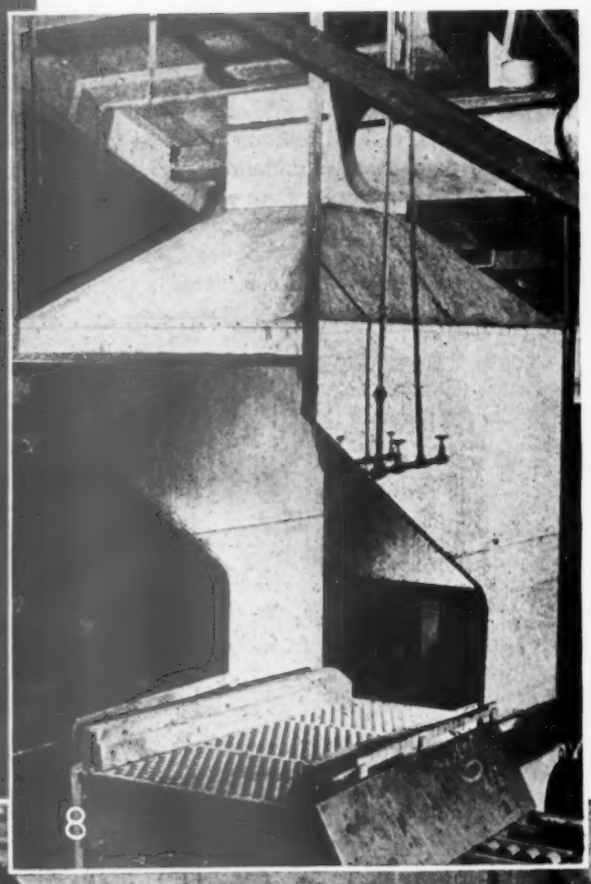

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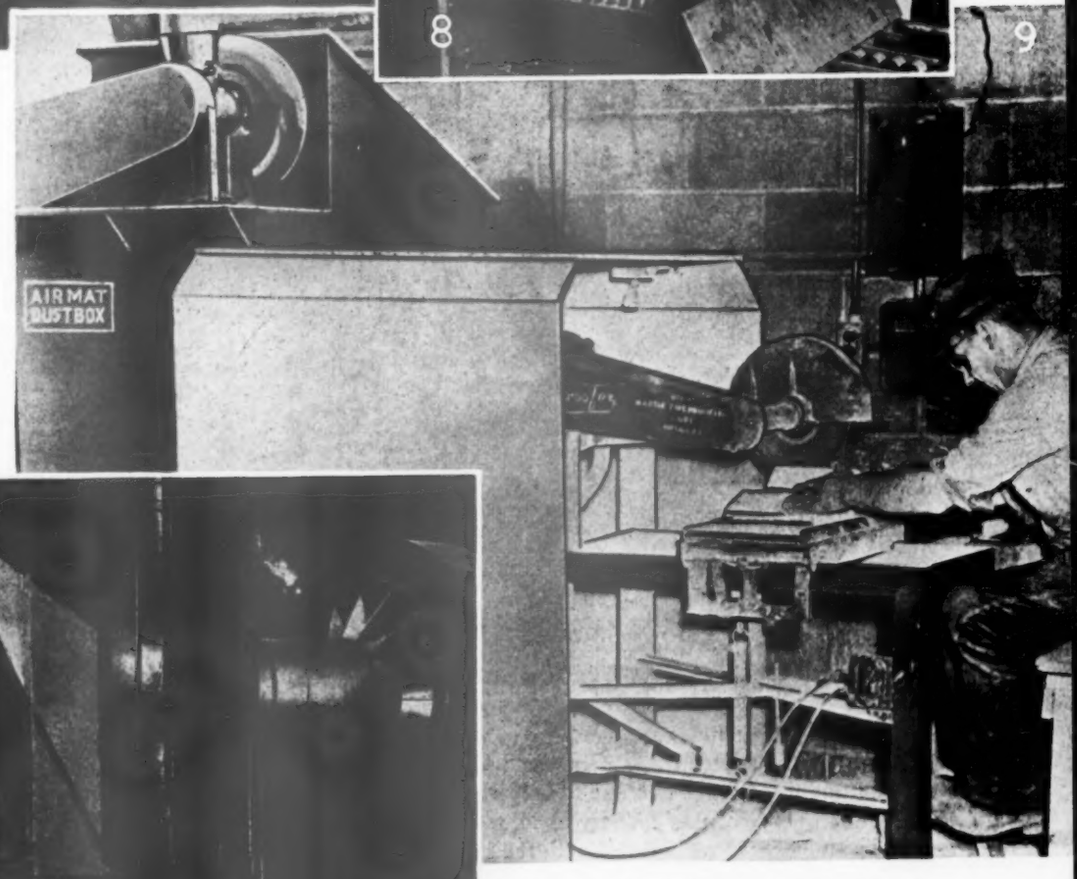

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Fig. 5—Side shield is recommended addition to prevent disruption of dust control by cross drafts

Fig. 6—Air flow diagram where hood extends beyond shakeout

Fig. 7—Effect of side shield on air flow diagram

Fig. 8—Feed opening and casting discharge opening of enclosed hood will vary with method of delivering flask to shakeout and with size of casting and flask

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Fig. 9—Booth type enclosure controls dust from masonry abrasive wheel used in sizing refractory brick

Fig. 10—Where overhead crane is used for moving flasks to shakeout, the side hood is the most practical

CONTROLLING Gray Iron Quality

Eternal vigilance in every detail is the price of quality control, the author emphasizes in his discussion of various factors contributing to production of high-quality castings. This paper was presented before the 17th annual convention of the Gray Iron Founders' Society in Chicago

By JOHN E. LINABURY
Foundry Engineer
General Motors Corp., Detroit

THE quality of anything is its nature or character; and to control means to regulate or influence. So we are to consider what we can do to regulate or influence the nature or characteristic of gray iron castings. We want to improve or hold uniform the good characteristics and reduce those that are undesirable. In order to agree on what these characteristics are we try to write specifications to cover them, using measuring sticks that are available.

I asked one man what he considered a fair measure of good quality. He replied: "The absence of scrap." That may be an indication of quality but it is not sufficiently comprehensive and it is a negative measurement.

A customer might buy castings from two sources and experience the same scrap loss from each, but if he had more tool trouble from the first due to hard spots he would consider the quality of that foundry as inferior to the second. He would be better satisfied with the second source.

The degree of satisfaction which the customer experiences from the use of your castings is his measure of your quality. That is a comprehensive statement, and covers many factors which we have to measure for compositely rating, except possibly by the desire of the customer to keep you as a source.

If you regularly supply what he desires you have established, to some degree at least, a quality control of your castings. You have satisfied his specifications, written or mental. But these same castings might be very unsatisfactory to the next customer whose specifications are different.

Thus there are many and varying requirements that enter into control of quality. Some of these are tangible, with fixed standards of measurements, and some are rather intangible, with no fixed standards, but quite necessary to control. If we vary or overlook any of these factors, the customer's satisfaction will be affected. No one department establishes the quality, but the responsibility for it rests with management. The casting salesman, the patternmaker, the material buyer, the metallurgist and the operating departments all share this responsibility. The customer also has his responsibility in his design and specifications.

The specifications must cover the form and dimensions of the casting, with finish allowances where required. In many cases these are taken care of in a separate casting drawing. Location points and any statements regarding the surface conditions also should be shown. These points must be under our control. We must also control the material in the casting as to hardness, strength, texture and other mechanical qualities.

For precision we must control the equipment we use to make sure that it gives accurate form and size to the casting. This applies to patterns, coreboxes, molding machines, core machines, cleaning equipment and sand mixing equipment. We must also have control over the nonproduction materials such as sand, clay binders, etc. even such things as chaplets.

Lastly, we must have control over our labor to see that our metal and coke are used correctly, that the molds are made and poured to make good castings and finally that they are properly ground and cleaned to the satisfaction of the customer. When we can control these we will have quality control that is effective.

A few months ago one of our divisions which does not have a foundry, but buys all its castings, made a study of the losses and expense incurred because of defective castings from its various sources. Curves were plotted for various parts showing the percentage of loss each week from the sources. Comparing these curves for a period of several months showed at once which foundry making any part had the best control. For a certain casting one foundry had been the source for several years and rejections were averaging about 13 per cent. Then a second source was found for that casting and the rejections from each were plotted each week. These comparison curves were very interesting. They (*Please turn to page* 250)

MOLD CAVITY VARIATION

By ROBERT CLELAND JR.
Buffalo

THE mold cavity is the volume of space within the mold which will be filled with metal under normal conditions of gating and pouring. The surface of the cavity may be sand or mold-wash, or gas, or a combination.

In routine operations the size of the mold cavity is subject to considerable variation. Any change in the composition of the sand may lead to a change in the volume of the mold cavity. An increase in gassing agents may tend to reduce its effective size, while an addition of those materials which yield under the heat and pressure of the metal will act to increase the mold cavity. These effects are so pronounced that with consistent machine molding and well regulated metal, changes in the sand alone can cause the castings to come under or over tolerance.

The departure from dimensional accuracy is the most conspicous result of mold cavity variation. It is of particular importance on light green sand work where tolerances are very small. There is, however, a second consequence of greater general importance. The yielding of the mold under the weight and heat of the metal requires that the casting be fed for a longer period. Sometimes the feeders will not supply this increased demand, and the casting develops shrinks and porosity. The enlargement of the mold may so increase the dimensions of the casting that a satisfactory product can be achieved only by changing the feed system or the metal composition, or by substituting dry sand molds for the highly deforming green sand.

A shrink cavity need not be large to be serious. It is apparent that the total volume of metal represented by a small shrink may be distributed throughout the casting without measurably increasing its dimensions. For this reason, it is sometimes difficult to correlate shrinks with mold cavity enlargement. In green sand work it is only possible to hold the sand suspect whenever shrinks develop.

Such variations in the mold cavity result basically from the two conditions mentioned previously. With high gas content and relatively low permeability, the casting will tend to freeze against a cushion. If the mold is made up to include materials showing high yield under weight and pressure, the cavity will enlarge under the force of the metal. It is not uncommon to see a green sand casting with an oversize drag, and an undersize cope.

Localized mold cavity variation may result in a swell, which is known to be caused by a soft spot. It may also cause a cold-shut or misrun. Soft rammed molds can also produce effects resembling mold cavity enlargement. True mold cavity variations develop, however, under consistent molding, and mold hardnesses as high as 70.

In considering the effect of various molding materials on mold cavity variation, it is necessary to bear in mind the fact that some which tend to reduce the size of a small mold cavity may have the opposite effect on larger mold cavities. The extent to which any gassing material reduces a mold cavity will also depend on the permeability. As the basic grain of the sand becomes coarser, the tendency of the mold cavity to enlarge will increase.

The following tabulation is not complete but will suggest to the sand controller the factors to be considered in seeking the cause of shrinks and porosity—insofar as they are caused by the sand—and of dimensional inaccuracy.

Water: The quantity of moisture in the sand can vary the volume of the mold cavity as molded, and as cast. If the sand is molded on the very dry side it may not ram tight to the pattern, and the mold cavity will be oversize. If it is molded on the heavy side the mold cavity may be enlarged under the pressure of the metal and the casting will be oversize. With small castings, or light sections, moisture has a strong chilling effect, and the effective mold cavity will be reduced. Steam does not seem to form a gas cushion; such misruns as may be blamed on moisture appear to result from the rapid chilling. In general, high moisture will increase large mold cavities and reduce small cavities.

Fines: Fines act to stabilize the dimensions of the mold cavity. They sharply reduce the yield in heavy sections even when other factors contribute to its enlargement. By the same token, they tend to reduce small cavities. The effect of fines is directly related to the permeability of the sand and to its mechanical strength. A reduction in fines gives an increase in permeability, which means a smaller gas cushion. It also gives a reduction in the mechanical strength of the mold, which will act to increase the size of the mold cavity. Because all normal synthetic molding sands—and most natural sands—tend to yield somewhat under the force of the metal, a sharp increase in fines may result in undersize castings. The opposite is equally true. Quick results may be had in altering casting dimensions, or in reducing shrink tendencies, by making a suitable change in the percentage of fines. Where an increase in fines is needed, silica flour, fine natural molding sand and possibly iron oxide may be added.

Corn Flour: Corn flour and (*Please turn to page* 220)

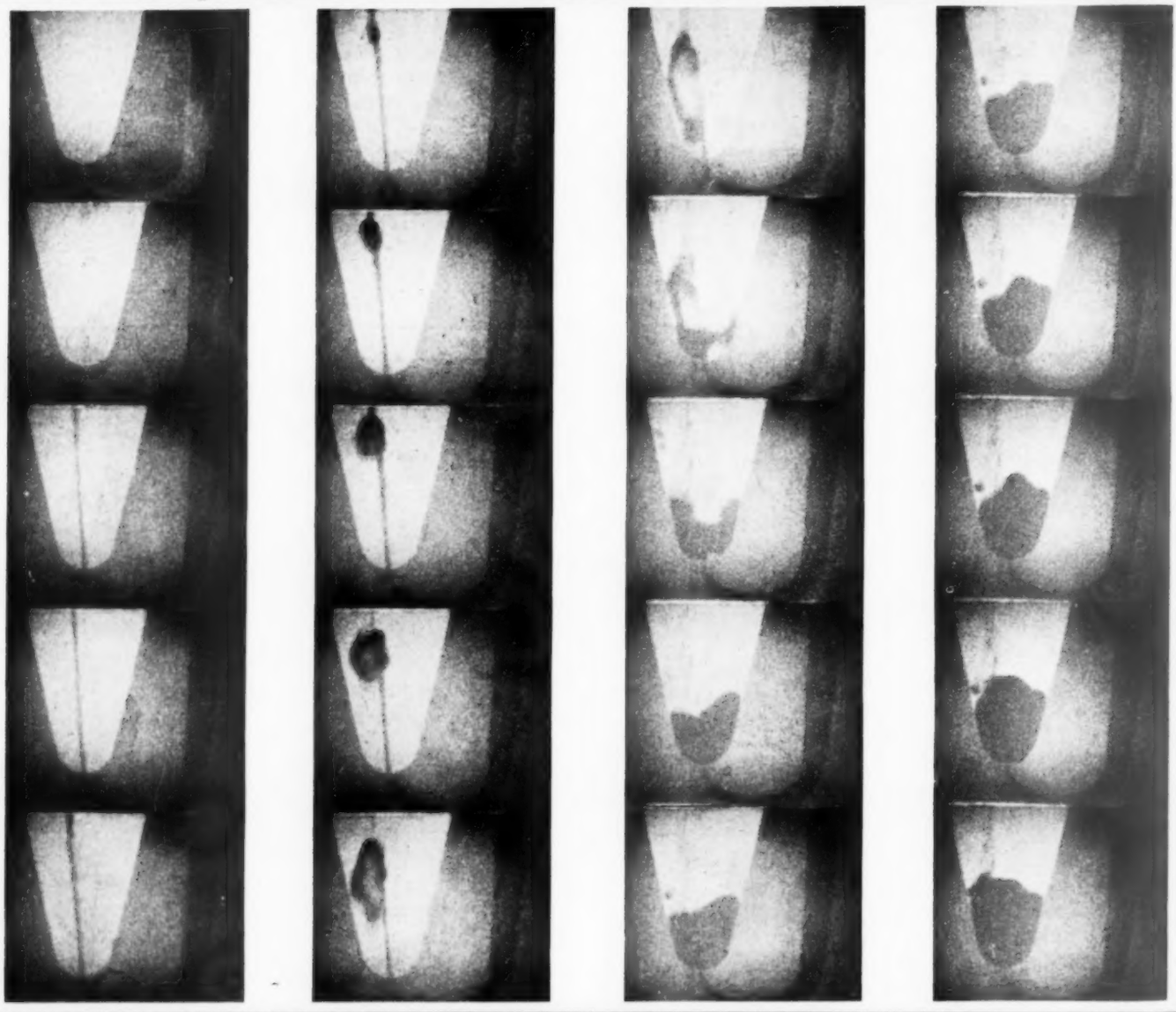

Fig. 1—Pictures taken to observe effect of different pouring rates. This is a fast pour

Motion Radiography o

EVERY foundryman at some time or another, has earnestly desired that he could look through a mold and observe the behavior of the metal, for he has felt that direct observation of the formation of the casting would be of great value in the understanding and, subsequently, in the solving of his casting difficulties. With the basic requirement that the mold should be as nearly as possible like that used in the foundry, it was obvious that the only way to see through it would be by the use of x-rays, and an attempt was made along that line.

The first possibility considered was the taking of normal x-ray negatives through the mold at intervals to see the progress of the metal at various stages, but it was found in practice that this idea did not hold much advantage over the previous method of part pouring a casting. The only alternative was by indirect radiography, and it was decided to investigate the possibility of examination by use of the fluorescent screen.

As is well known, several types of crystalline screens are available which have the property of fluorescing under the

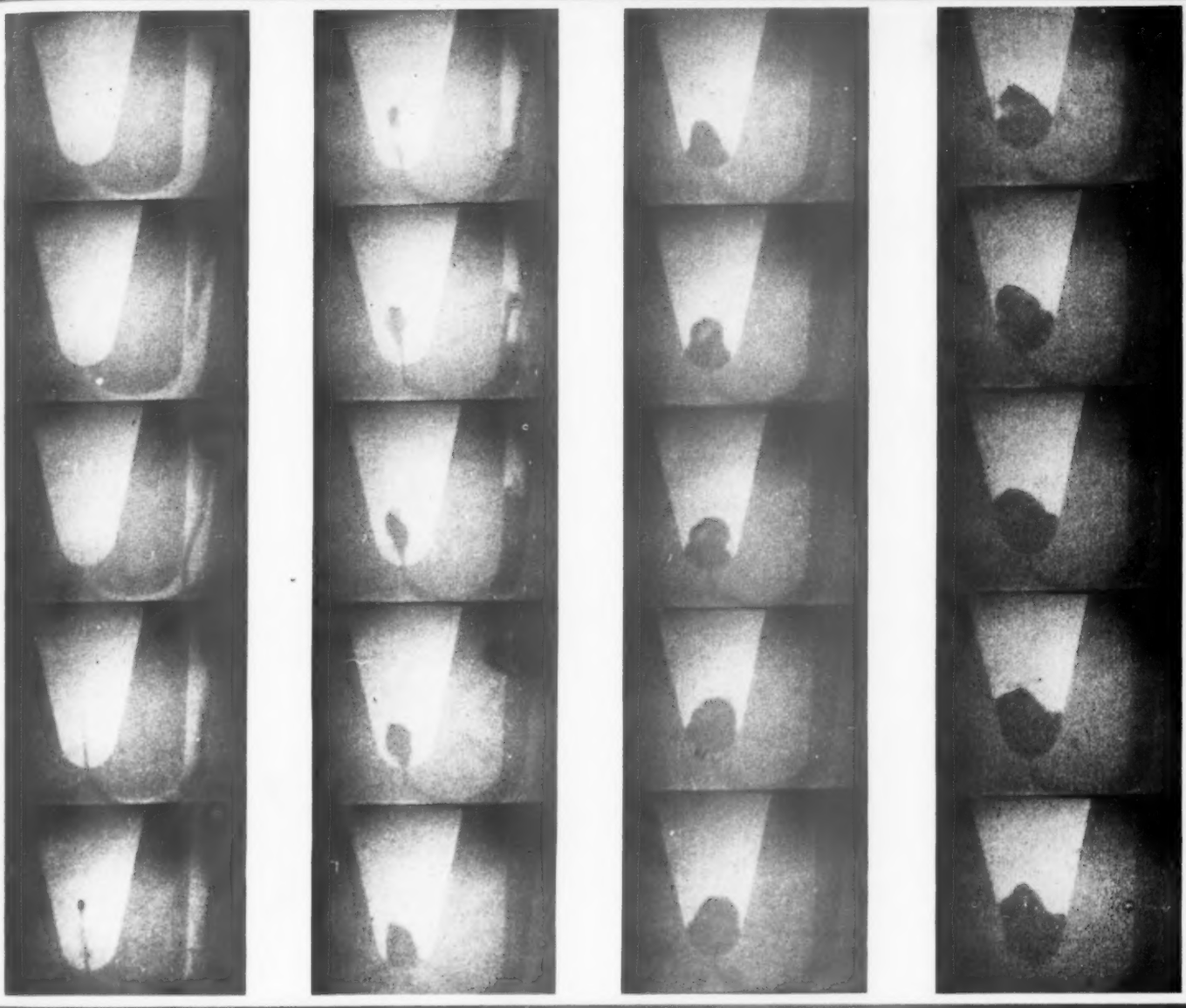

Fig. 2—Same casting being poured as in previous figure but at a much slower rate

Mold Pouring

By S. L. FRY
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Combination of the motion picture camera, fluorescent screen and x-ray permits recording and subsequent study of what occurs when molten metal is poured into a mold. This article is from a paper presented at the last annual meeting of the Institute of British Foundrymen

action of x-rays. These give a visible indication of the presence of the x-ray beam and the use of this method is known in radiography as screening. By interposing an object between the x-ray tube and the fluorescent screen a shadowgraph of the specimen can be seen on the screen. In the application of this technique to the problem in hand, the x-ray tube was placed behind the mold and the fluorescent screen in front, and the resultant image of the mold was examined on the screen. Of course, the mold had to be severely limited in size, but when this condition was met,

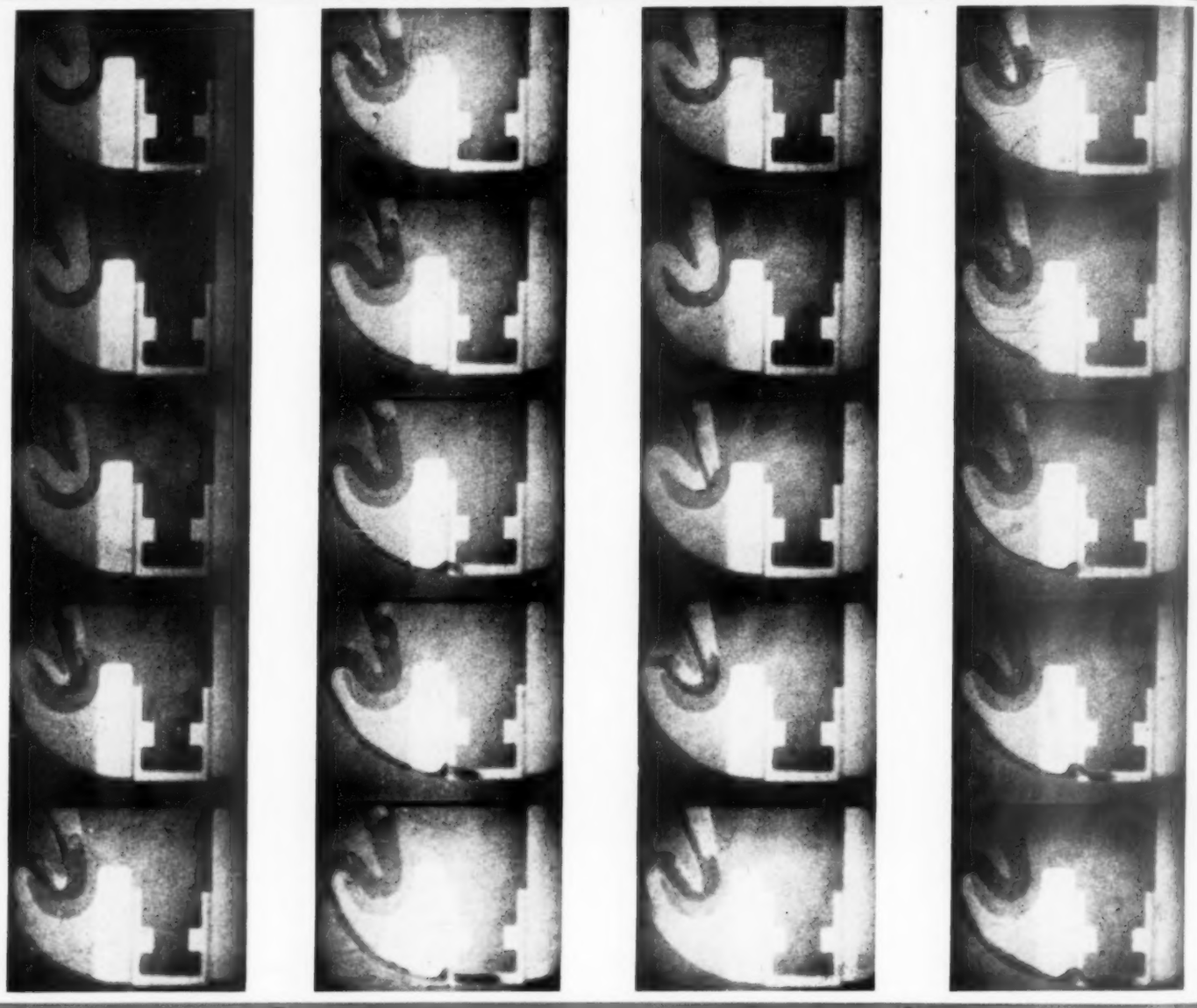
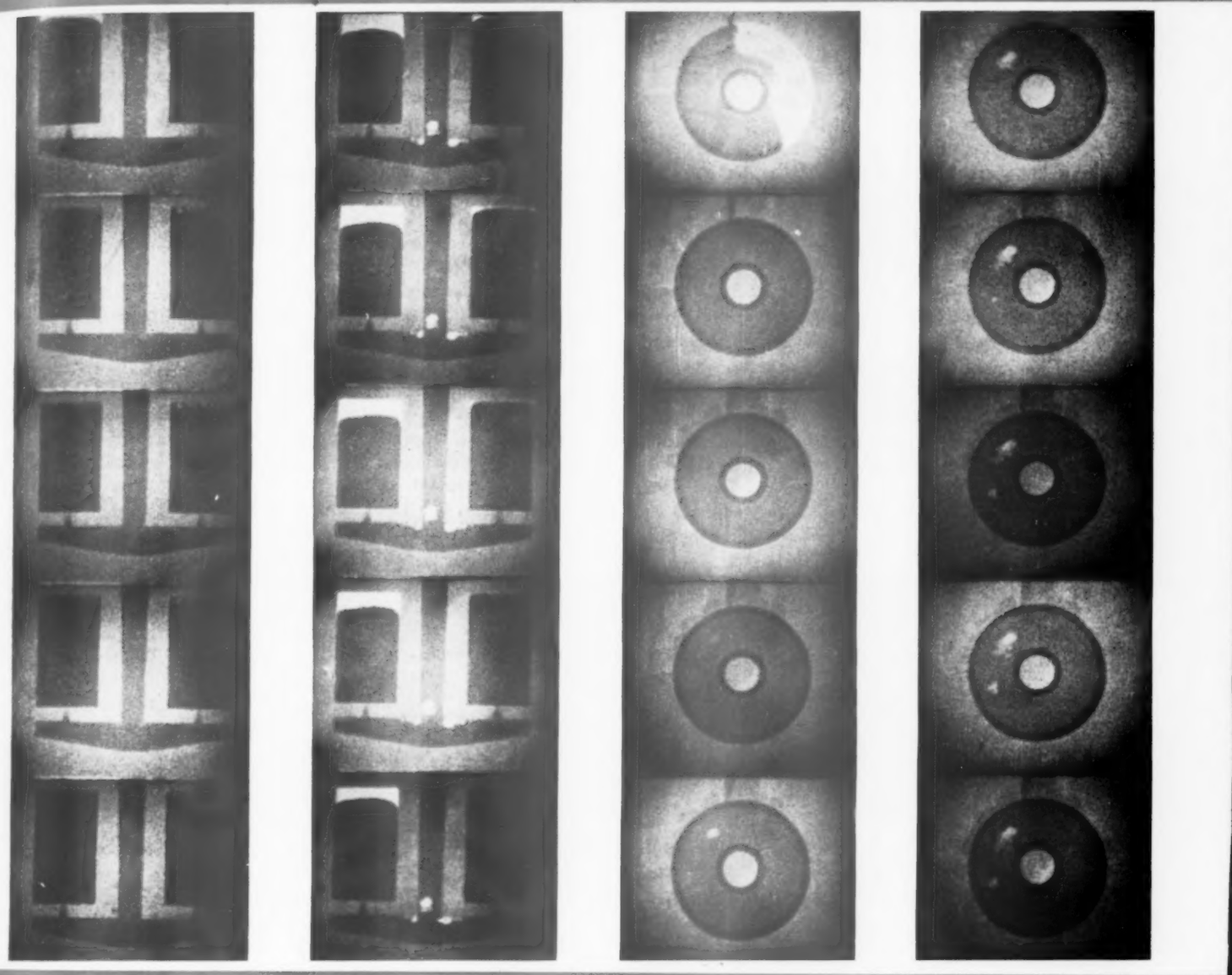


Fig. 3—Illustrating effect of a swan-neck runner on different rates of pour. In this case the mold was completely filled in 4⅛ sec, compared with 2⅝ sec in Fig. 4

a clear picture of the mold shape and the flow of the metal could be seen. A logical development of this was to photograph the screen, which meant that, although the pictures could be taken very quickly, each individual negative could be studied later and information could be obtained at every stage. A diagram of the arrangement is shown in Fig. 8.

The first experiments were directed at assessing the maximum thickness and area of mold, and also the thickness of specimen. If the mold were too thick, it would mean that no x-rays could get through, with the consequent lack of fluorescence on the screen. In this respect development was handicapped by the fact that only standard industrial x-ray sets were available, which, being designed for continuous output, had a fairly low tube current. After some trials it was decided to proceed using the following sizes:—Area of mold, 11 x 9 in.; thickness of sand, 2 in.; and a casting thickness of ½-in. Under these conditions it was found that the screen was just sufficiently bright to be photographed with the fastest lens and film available. Having arrived at the dimensions, the first trial setup, consisting of the specimen box and the camera box or tunnel, was started. The specimen box was fixed at one end to the x-ray tube and had a small platform at the other end to support the mold. The internal dimensions were 11 x 9 in., and it was lead lined on the inner surfaces to restrict the x-rays within the box for the safety of the operators. To secure the maximum output of x-rays reaching the mold the specimen box was made as short as possible, and on the first x-ray set this length was 12 in., at which distance a sufficiently large field to cover the area of the mold was ob-



Figs. 5 and 6—Showing effect of venting to permit escape of air. Fig. 6 employed faster pouring. Fig. 7—Indicating effect of horizontal pour and growth of shrinkage cavities

tained. Although this short distance meant some sacrifice of definition, it had to be tolerated for the sake of getting a reasonable thickness of specimen. In any case, at this stage there were factors in the apparatus which were giving less definition than that due to the x-ray equipment.

The camera box or tunnel was of the same cross section as the specimen box, chiefly for ease of manufacture and alignment, and was also lead lined. In this case the length of the box was governed by the field of view of the camera lens and had to be so arranged that the screen image completely filled the negative. The fluorescent screen was placed at one end of the tunnel and the other end was sealed with a steel plate onto which the camera platform was bolted, and through which a small hole was bored to accommodate the lens. The molds up to this stage had been fixed in thin wooden boxes, but after some experiments it was found possible to use unsupported layers of core sand. A few runs were made using a 35-mm. still Robot camera and, after a few trials, it was obvious that the method was a success, although with the particular camera in use it was possible to obtain neither a sufficient number of pictures or the desired frequency, and the next experiments were made with a 16-mm. ciné camera with *f*. 1.5 lens, and varying speeds and single picture device. All the results shown in this paper were taken with that camera on the modified set-up (Fig. 9). A number of exploratory pours were made in lead, which was selected for its ease of melting and high density. The resultant pictures had a high contrast, a great advantage, because of the wide difference in x-ray absorption between the heavy lead and

the comparatively light sand which formed the mold.

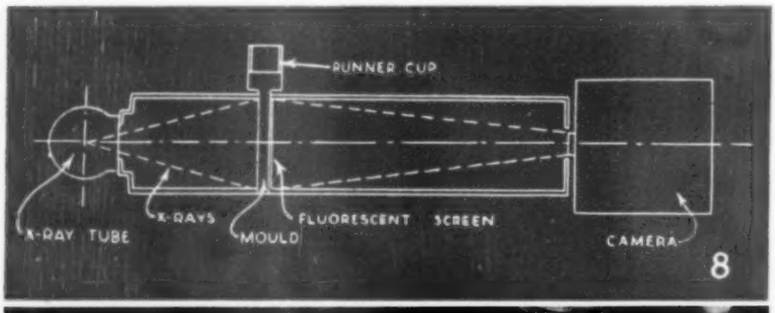
Some pours were then made in aluminum, and, due to the much lower density compared with the lead, there was a considerable drop in contrast. It was then realized that if a slight increase in penetration could be secured, it would be possible to record internal details of the mold and casting with the same exposure.

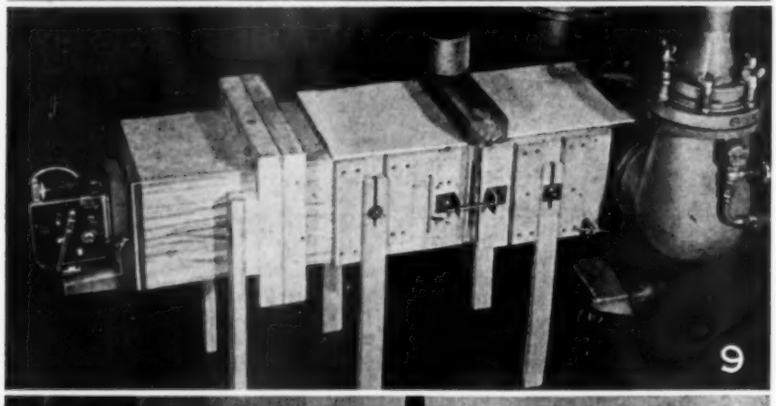
More film speed, and therefore extra penetration, was obtained by changing the type of developer, but the problem of increasing the overall contrast remained. The best method of improving the contrast would be by the reduction of the kilovoltage on the x-ray set, but this could not be tolerated on the 200 kv, 10 ma set in use. The possibility of transferring the whole setup to the smaller x-ray set immediately available seemed at first to be a retrograde step, but after making a number of trial exposures, it was shown conclusively that the screen at 140 kv, 8 ma on the smaller set was brighter than at 200 kv, 10 ma on the original equipment. Another great advantage of using the 140 kv set was its very small target area, 2.3 mm square, so that in addition to the improvement in contrast the linear definition was appreciably finer. Consequently, all subsequent experiments have been carried out with the 140 kv, 8 ma set. This is over the official rating for the tube, but no trouble has been experienced at any of the experimental periods up to the present.

Photographic practice was fairly standard, but great care was exercised at all stages. Cleanliness was of paramount importance. Maximum emulsion speed was also required. All the films were developed in fresh developer at 70 F with continuous agitation. After a number of trials Ilford HPX film and a Levy West AYS screen were selected as the fastest combination for the 16-mm results, although a number of the results shown are on Kodak film. On the 35-mm film, which was used later, the coaser grain of Ilford GX film could be tolerated for the sake of the extra inherent contrast of this film.

Virtually no improvement of the x-ray technique could be made without more powerful equipment, so attention reverted to the photographic side, and eventually a 35 mm ciné camera with a 5 cm *f* 1.5 Sonnar lens was obtained and fitted with an electric motor driving the hand crank. This in turn was coupled to the x-ray set so that, immediately the latter was switched on, the camera started to run. The definition tests from this apparatus showed a great improvement. Further experiments were then made with film and developer, and various filter and grids were also tried on the x-ray set, but it was found impossible to allow the slightest reduction in the amount of x-rays reaching the mold. This latest set-up, by no means final, is shown in Fig. 10.

Nearly all the pictures taken with the 16 mm camera were run at 16 frames per second, and the results printed in strips of five pictures onto bromide paper. Some of the films were run on a ciné projector, but, of course, at the normal taking and projecting speed the result was no different from direct observation of the fluorescent screen. It was an experience, however, to watch the metal running up inside the mold, so it was decided to take one pour in slow motion at 64 fps. Running the camera at the higher speed reduced the exposure on each picture, but this was not nearly so problematical as trying to overcome the fluctuation of the screen intensity caused through the incomplete rectification of the alternating current supplying the x-ray set. Normally the fluctuation was not apparent, but when the periods of alternation between maximum and minimum brightness were slowed up by four times (the result of taking at 64 fps) the variations were very noticeable. Apart from these diversions it was felt that the results should not be run on a (*Please turn to page* 163)





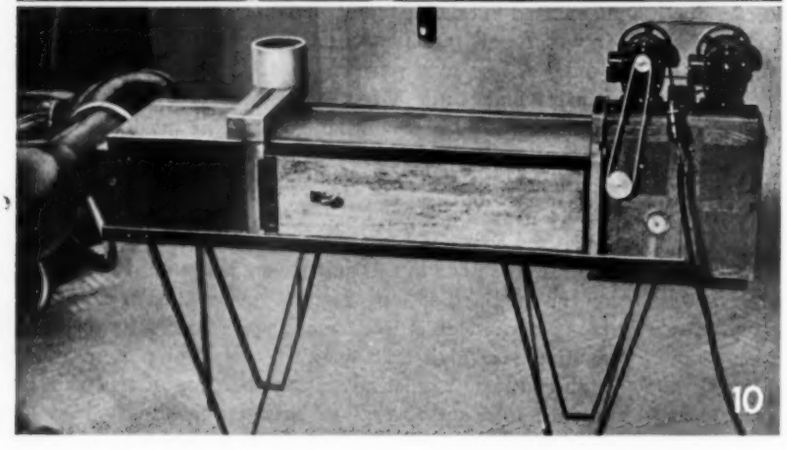


Fig. 8—*Diagrammatic sketch of appartus used in study of mold pouring*
Fig. 9—*Second modification of equipment*
Fig. 10—*Apparatus in its final form*

The Age of Green and Dry Sand Molding

By DR. J. E. HURST
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THE CASTING of metals is probably as old as civilization itself. Examples of castings have been found and recorded in England, Europe, China, and, in fact, in all places where early civilization has been studied dating back into the centuries B. C. The casting of metals involves the preparation and use of patterns and molds, and while there are many studies of the historical development of the foundry industry as an industry, detailed records of the early methods of pattern-making and, more particularly mold and coremaking, are very scarce.

From many points of view ironfounding as we know it today may be regarded as having its beginning in England during the later portions of the 17th and the early part of the 18th centuries. In so far as ironfounding is concerned it is undoubtedly true that the greatest impetus in its development came about with the introduction of machinery and the developments in blast-furnace smelting arising out of the use of coke fuel instead of charcoal. This great development in foundry products led to almost feverish activity in the substitution of cast iron for wood, copper, lead, brass and other materials but most of all for wrought iron.

The cradle of English foundry industry was the county of Sussex, where the blast furnace made its first appearance, and there is every reason to believe that in England ironfounding followed the introduction of the blast furnace. According to Rhys Jenkins, from the beginning to about the closing years of the 15th century the ironfounding industry in Sussex was based mainly on the production of war material, shot and guns. In the main this was so throughout the whole course. However, records disclose that open sand castings, chimney backs, firedogs, and grave slabs were produced at the Sussex furnaces as long as they continued at work. Open sand work may not be regarded as of particular importance in the history of ironfounding, but it is of considerable interest in any study of the early origins of sand molding.

The chimney backs, also known as fire-backs, are plates intended to protect the wall at the back of an open fire place. The earliest documentary reference to their production is the accounts of the Worth Furnace for the years 1547 to 1548 from which it is learned that the total output of guns, shot and sow iron was 264 tons, and in these two years four chimney backs were made and valued at 3/4. each. No doubt such castings were made long before, from the time the blast furnace was introduced. At first they would probably be plain plates; a man would bring a piece of board the size he wanted his plate, and this would be impressed in the sand to make the mold. From this the step is a small one to imagine the introduction of some ornament in relief on the bottom side of the mold or face of the plate casting. There are some fine examples of such backs in existence, also of firedogs and fire irons, hammer heads, anvils and grave slabs, an interesting example of the latter being dated 1591 at Crowhurst, Surrey.

Apart from open sand castings of this type, other castings, guns and shot, were all probably molded in loam. Similarly, pot founding done at this time utilized loam molding methods. There are records of pot founders in Sussex for the years 1613 to 1617. Rhys Jenkins gives an account of a method of molding guns as described by St. Remy in 1693, and while this is concerned with the production of bronze guns, one need not hesitate to accept it as applying substantially to the production of guns in iron.

The method described is essentially that of the production of a loam pattern. A core barrel, mounted on trunnions and well greased, was wound with straw rope and coated with layers of loam mixed with powdered brick. For the last coating butter and horse dung are mixed with the loam, and by means of a strickle board the external shape of the gun barrel, including the collars, was formed. After careful drying external ornament made in wax was fixed. The mold from this false pattern or loam pattern was again prepared by the further application of loam. The loam pattern was greased and layers of loam applied for a thickness of some 4 in. The whole assembly, after careful drying and bound around and longitudinally with iron bands, was set up vertically in a casting pit. Burning wood placed in the casting pit melted the grease, leaving the interior of the mold clear.

This description implies a method of molding relying completely on the use of loam. Similarly, in the casting of bells, loam methods appear to have been used, and it is quite likely that pot founding, casting various types of domestic articles, relied on this same medium. What is certain is that in the descriptions that have been handed down there is little indication during this period of the use of rammed sand molds of the type which made its appearance in later foundries. As far as British records are concerned, it would appear that foundry methods as we know them today had their beginnings in the early part of the 18th century. It is uncertain as to whether at that time the art of casting was less advanced in England than abroad.

It is recorded that the Dutch in particular, by reason it was alleged of superior skill, lower duties, and cheaper labor, were formidable competitors of Britain, especially as regards the sale of iron pots and similar utensils. Abraham Darby, who at this time of his life (1699) was a brass founder in Bristol, visited Hol- (*Please turn to page* 208)

How the Navy handles metallurgical problems relating to nonferrous castings is detailed in this seventh of a series of articles dealing with foundry research. A discussion of the Navy's research in ferrous castings appeared in the July, 1945 issue

Nonferrous Foundry Research- At the Naval Research Laboratory

AT THE present time almost two-thirds of the castings used by the Navy are made from nonferrous metals, and some of the largest nonferrous foundries in the United States are to be found in the Navy Yards. In general, these Navy foundries produce widely diversified types of nonferrous castings ranging in weight from a few ounces to more than 100,000 lb. The research problems encountered in the course of this extensive industrial activity cover the entire field of nonferrous foundry metallurgy. Some of the problems are solved by the metallurgical staffs of the Navy Yards, while those requiring longer periods of research are usually sent to the Naval Research Laboratory.

The Division of Physical Metallurgy of the Naval Research Laboratory was established in 1927, but it was not until some years later that the subdivisions or sections were organized according to the well defined branches of metallurgy. The Division of Physical Metallurgy has grown considerably under the able direction of the superintendent, Dr. F. M. Walters Jr., who is well known for his wide experience in research in metallurgy. The six sections of the division, Nonferrous, Steel Castings, Welding, Special Alloys, Radiography and Analytic Chemistry, were well prepared in equipment and men to meet the urgent needs in metallurgical research resulting from the war.

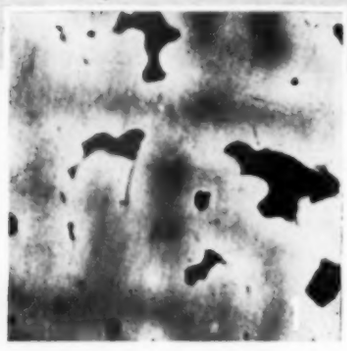
The function of the Nonferrous Section is to conduct research on the nonferrous problems assigned to the laboratory by the various bureaus of the Navy Department. This research is nearly equally divided between applied and fundamental metallurgy. Since the primary aim of metal-

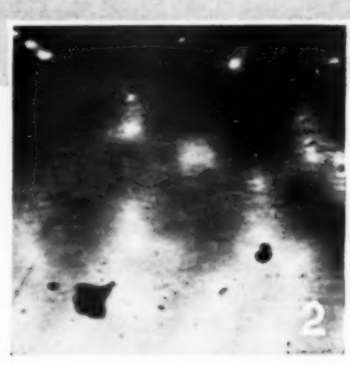
Fig. 1—Microradiograph (75X) of gun metal. Composition 88-9-3 (Cu, Sn, Zn)

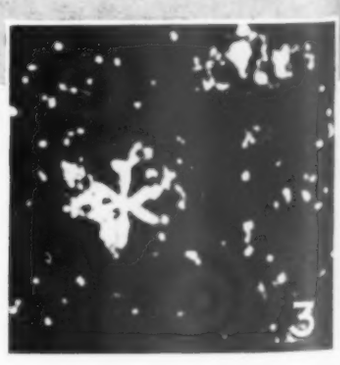
Fig. 2—Microradiograph (75X) of nickel-tin-bronze. Composition 88-3-6-3 (Cu, Ni, Sn, Zn)

Fig. 3—Normal structure of manganese bronze as shown by 200X microradiograph

Fig. 4—Segregation of the iron-rich constituent in manganese bronze; microradiograph 200X







lurgical research is to establish a scientific basis for metallurgical practice, it is very advantageous to have applied and theoretical problems proceeding simultaneously. The conclusions of the theoretical investigations are immediately put to test under practical operating conditions in the foundry.

The Nonferrous Section, under the supervision of Dr. Blake M. Loring, is further subdivided into groups specializing in the various types of nonferrous alloys. The copper base alloy group is the largest and is comprised of Lt. Robert A. Colton, Russell G. Hardy CS(X), Lt. (jg) John

Fig. 5—Welding a tin-bronze test plate in the welding laboratory

Fig. 6—Left to right, front row: Dr. F. M. Walters Jr., superintendent, Division of Physical Metallurgy; Dr. Blake M. Loring, head, Nonferrous Section; Lt. (jg) John T. Robertson; CSp(X) Russell G. Hardy; Lt. (jg) James B. Russell. Back row: William H. Baer; Lt. Robert A. Colton; Lt. (jg) William Richmond; Ensign Ralph H. Brouk; George M. Carlton

By DR. BLAKE M. LORING
Head, Nonferrous Section
Naval Research Laboratory
Anacostia Station, Washington

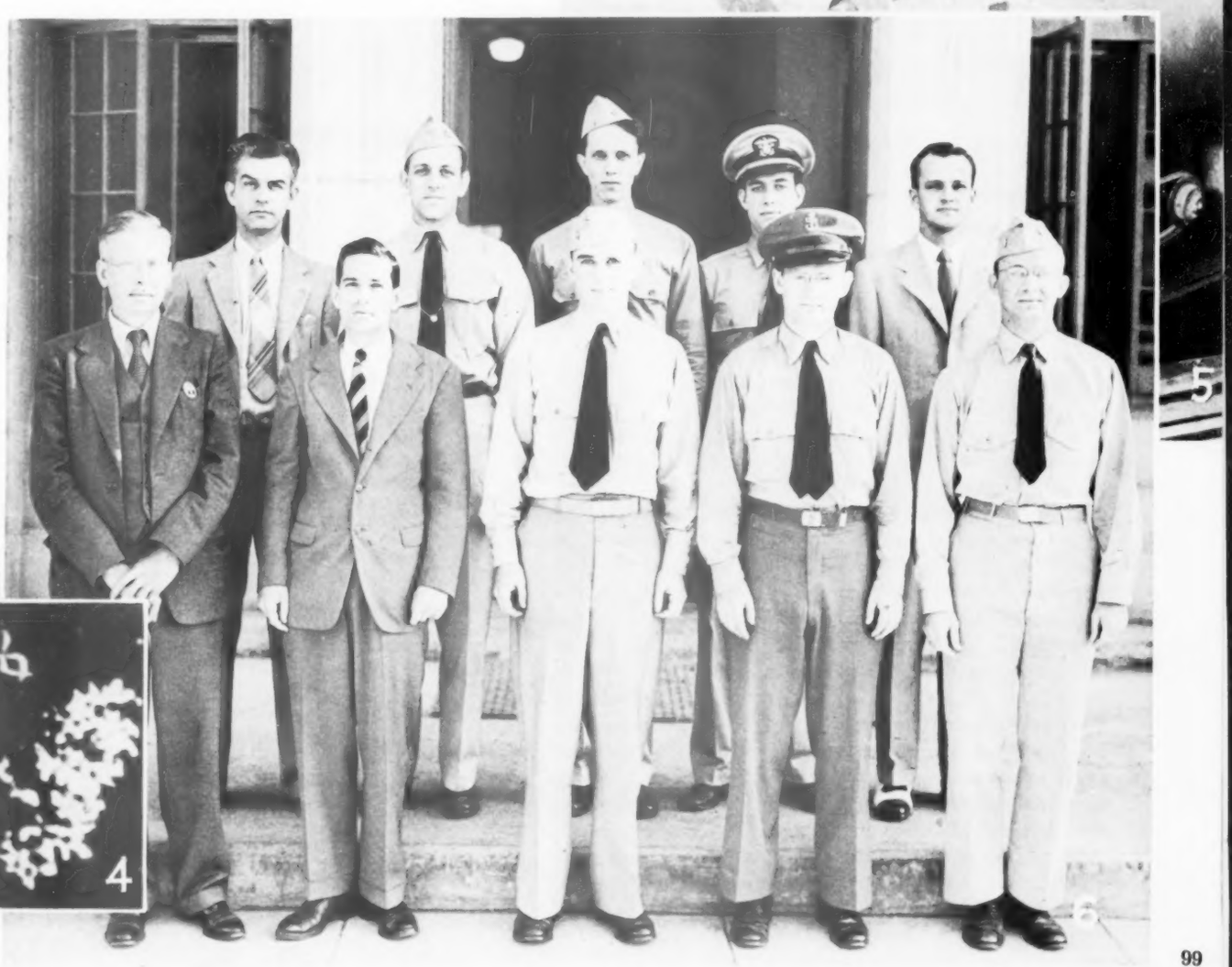


TABLE I—Composition and Mechanical Properties of Manganese Bronze Made from Fired Cartridge Cases

Heat No.	Type of Case	Composition, Per Cent								Mechanical Properties		
		Cu	Zn*	Sn	Fe	Al	Mn	Sb	Pb	Yield Strength, psi. (0.1 Per Cent Offset)	Tensile Strength psi	Elongation. Per Cent in 2 in.
E25	50 cal.	57.86	39.17	0.49	0.95	0.90	0.68	<0.005	0.02	40,000	77,000	22.7
E25A	50 cal.	57.86	39.17	0.49	0.95	0.90	0.68	<0.005	0.02	40,200	77,200	23.0
E24	40 mm.	58.91	38.38	0.51	0.77	0.68	0.82	<0.005	0.005	30,000	70,200	37.0
E24A	40 mm.	58.91	38.38	0.51	0.77	0.68	0.82	<0.005	0.005	27,500	70,500	38.0
E21	Mixture	57.39	39.72	0.55	0.80	0.89	0.65	0.005	0.005	32,500	76,000	21.1

*By difference.

T. Robertson, and Lt. (jg) William Richmond. The light alloy group at present consists of three members, Lt. (jg) James B. Russell, Kenneth Matteson AMM 1/C, and Ensign John Ciborsky. Foundry techniques are studied by the foundry practice group composed of the following: Ensign Ralph H. Brouk, William H. Baer and Lt. (jg) Ralph Fox. Within the section there is scope for varied experience and the members of the section are encouraged to make the most of this opportunity, not being restricted to problems entirely in one group. The problems range in urgency and magnitude, some being of short duration but most requiring six months or more of constant effort for completion. Very often such problems are small segments of a large program which has been in progress for several years. In so far as possible, each metallurgist is kept fully informed of the entire program on which he and his associates are working. The members of the Nonferrous Section write their own reports and are encouraged to publish the results of their investigations in the transactions of the professional societies.

Practical Equipment Is Available

Much credit is due to the other sections of the division, the shops and the laboratory at large for the frequent loan of their equipment and services. The melting equipment, which was described in the July, 1945, issue of THE FOUNDRY, is in daily use by the members of the Nonferrous Section. With nearly as great frequency, the mechanical testing machine and metallographic equipment maintained by the Welding Section are used for nonferrous research. The welding of nonferrous materials, however, is the responsibility of the Welding Section which has an excellently equipped welding laboratory.

Welding tests on cast bronzes are being conducted on a co-operative basis. In Fig. 5 is shown the welding of a tin bronze test plate in the Welding Laboratory. Close co-operation is maintained with the X-ray Section, which has carried on extensive studies on the microradiography of nonferrous alloys and is now assisting the Nonferrous Section in the study of defects in bronze castings. Radiographic tubes, 3 million and 20 million-volt betatrons and radium are available for this work. Nonferrous castings being radiographed with the 3 million-volt betatron are shown in Fig. 11.

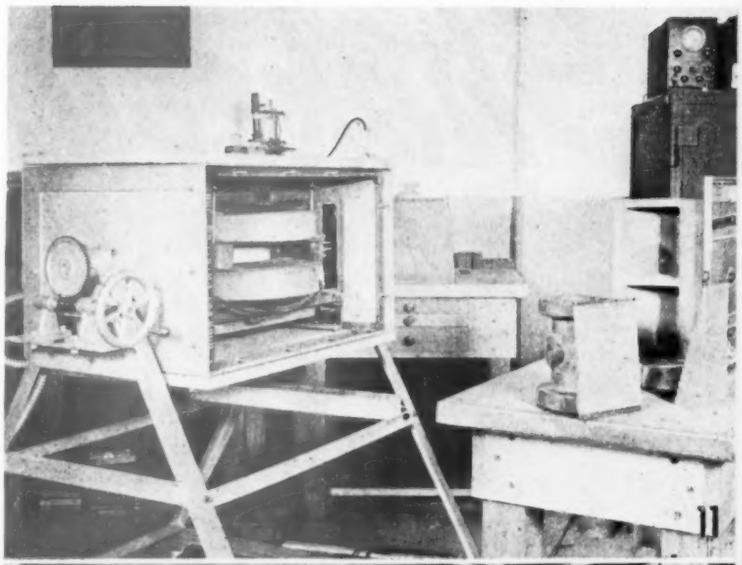
When it is necessary to investigate more thoroughly the constitution of cast alloys, x-ray diffraction equipment of nearly every description is available for the most precise measurements. Use is also made of the electron microscope and electron diffraction units of the Physical Optics Division. Few of the implements of the metallurgical research are not readily available, whether it be the spectrograph of the Analytical Chemistry Section or the controlled cooling rate furnace of the Special Alloys Section. The very complete heat treatment laboratory has been of constant use to the Section (Fig. 12). In return, the Nonferrous Section keeps its specialized equipment always ready for use by the other sections. The rolling mill shown in Fig. 13 is maintained by the Nonferrous Section and is often used by other sections and divisions. Good co-operation has many advantages.

Some of the developments of the Nonferrous Section became very important as a result of the necessity for conservation of tin early in the war. When the tin supply in the Malay States was cut off, work was already in progress on the substitution of nickel for tin in the tin bronzes. This substitution was found to be limited by the decrease in corrosion resistance of the bronze in moving sea water when too much tin is replaced. It was finally decided that a minimum of 5 to 6 per cent of tin was necessary for reasonably good protection, since this percentage of tin is

needed if a protective film is to form on the surface of the bronze.

Numerous tests have indicated that the saving of tin is not the only advantage gained by this substitution. With 3 or more per cent of nickel in the bronze the mechanism of crystallization is changed to give a much denser structure. This is best shown in Figs. 1 and 2, by microradiographs taken from corresponding positions in identical castings, one a gun metal 88-9-3(Cu,Sn,Zn) and the other a nickel-tin bronze 88-3-6-3 (Cu, Ni, Sn, Zn). There are no interlocking "pine-tree" dendrites and few intercrystalline shrinkage cavities shown in Fig. 2. It is evident from the microstructure, and also has been proved by tests, that the nickel-tin bronze is more pressure tight, has somewhat higher mechanical properties and is less subject to "mass effect" in heavy sections. All of these characteristics were recognized later by several commercial foundries where the alloy has found increasing favor.

Another approach to the problem of conservation of tin was in the use of alloys containing much less of the scarce element. Manganese bronze was frequently used for this purpose. This alloy has the further advantage that it can be made readily from foundry scrap. Occasionally, the practice caused great difficulties when the scrap was contaminated with too much lead or the iron was in such form that it tended to segregate. Fig. 3 shows the normal structure. The microradiograph of Fig. 4 shows the type of segregation of the iron-rich constituent which may cause low ductility in manganese bronze. The danger of such segregation increased considerably when fired cartridge cases were first used in mak- (*Please turn to page* 247)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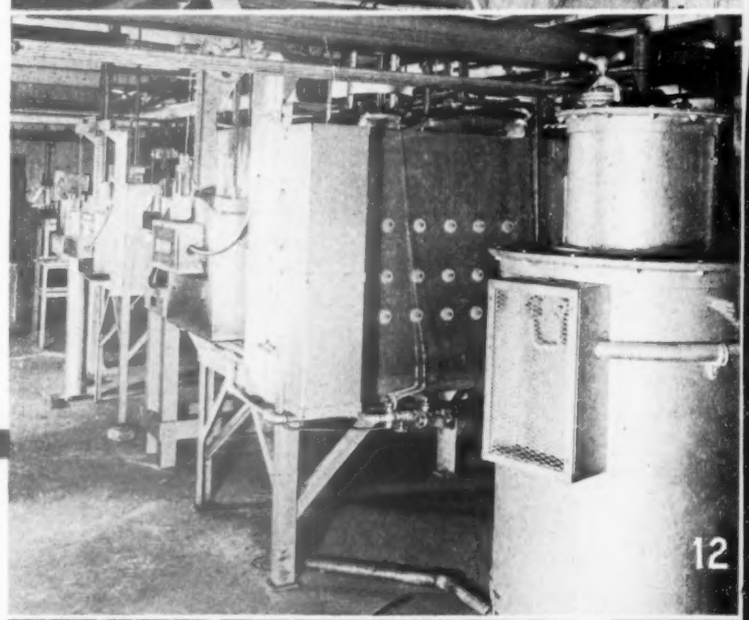
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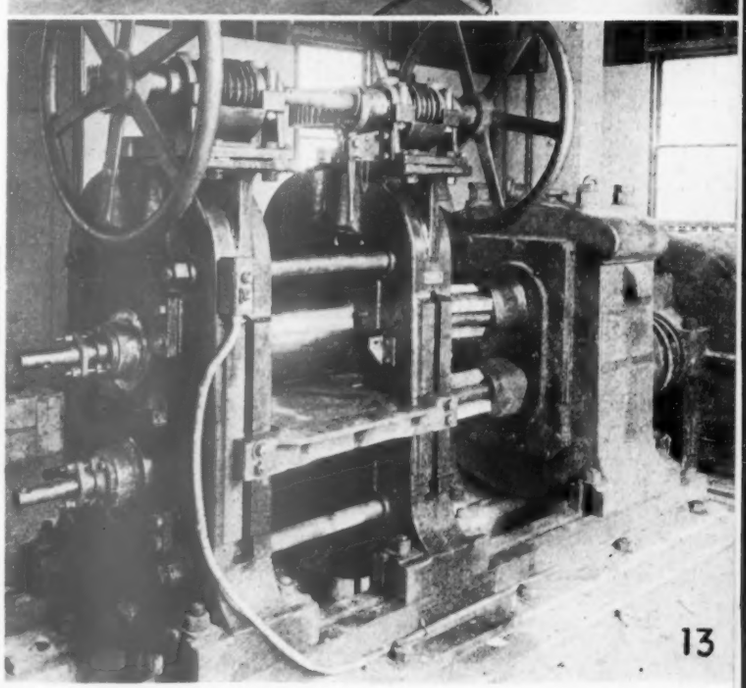
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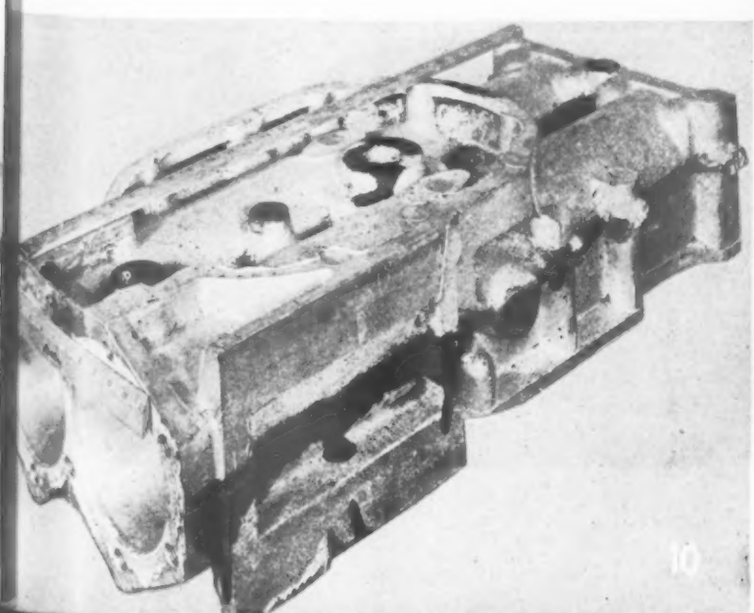
Fig. 7—Rear Adm. Harold G. Bowen, chief, Office of Research and Inventions, Navy Department, Washington
Fig. 8—Commodore Henry A. Schade, director, Naval Research Laboratory, Washington
Fig. 9—Pump body for PC boat. Navy Spec. (46B23C)
Fig. 10—Air ram cylinder of aluminum-copper-silicon alloy
Fig. 11—Castings in position for radiographing with 3,000,000-volt betatron
Fig. 12—Furnaces in the heat treatment laboratory
Fig. 13—Rolling mill for ferrous and nonferrous alloys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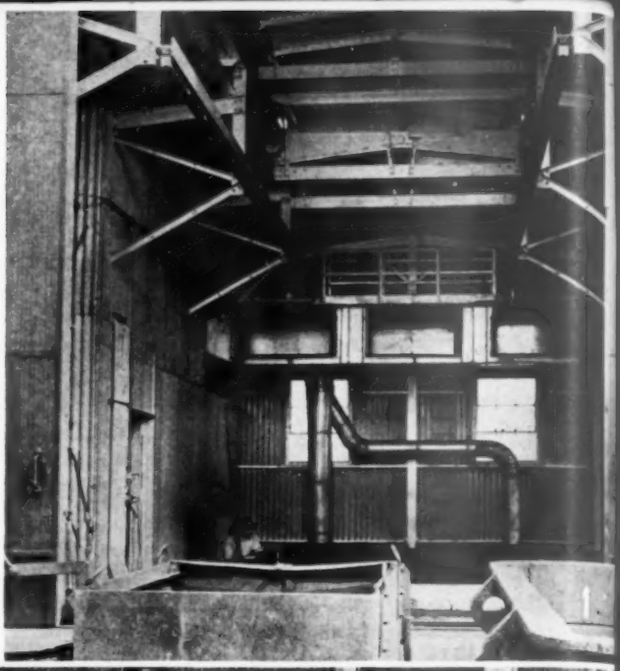
Shakeout handles large castings



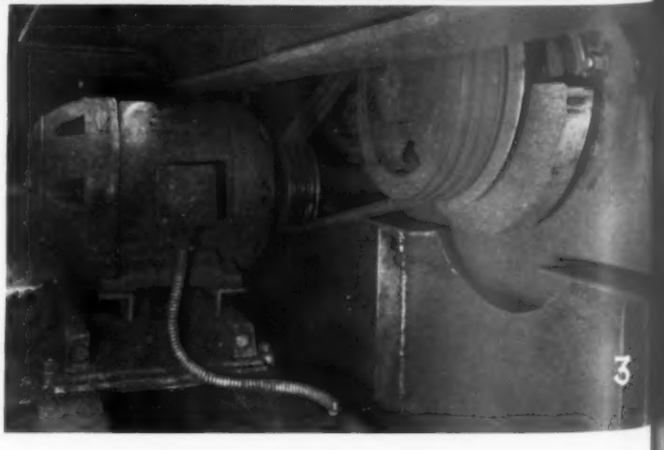


Fig. 1—View through entrance to shakeout cubicle, showing electrically-operated roof and doors

Fig. 2—Interior of shakeout cubicle. Vibrating shakeout deck has area of 396 sq ft

Fig. 3—Shakeout drive arrangement permits motor to move up and down with shakeout deck with little change in tension on belt. Note counterweight at right of driven sheave which provides vibration to shakeout deck. Driven sheave is bored eccentrically so shaft can gyrate as result of centrifugal force of counterweight while sheave rim runs concentrically

Fig. 4—Yard crane moving large flask from foundry to shakeout. Roof and doors of cubicle are open, preparatory to depositing flask on shakeout deck

Fig. 5—Sand storage silos, elevator and distributing belt house

WORTHINGTON Pump & Machinery Corp.'s Buffalo Works has placed in operation the "world's largest" foundry shakeout, designed to handle flasks weighing up to 75 tons (sand, casting and flask) and with a vibrating shakeout deck 396 sq ft in area. Coupled with the shakeout is a complete sand collecting, distribution and storage system which collects the sand from the shakeout, removes the fines, separates out tramp metal and transports it either into the foundry for conditioning or places it in storage. All dust incidental to shakeout or transportation of the sand is under control and the collected dust is discharged as wet mud.

By JAMES L. YATES
Construction Engineer
Worthington Pump & Machinery Corp.
Buffalo, N. Y.

The system in general is based on the corporation's previous experience with mechanical shakeout and mechanical sand handling equipment. Starting with a small mechanical shakeout 36 x 42 ft having a vibrating deck of 10½ sq ft; next an addition of a 5½ x 6½ ft mechanical shakeout; then, a 5 x 8 ft mechanical shakeout; and now this large foundry shakeout, the plant has mechanized its entire foundry shakeout operation.

The new system has advantages over former shakeout facilities and practices. Hours of dirty tedious manual labor in shaking out flasks of many sizes, including some 30 ft long, are eliminated. Sand is handled entirely by mechanical means. Instead of being stored inside the foundry itself, heap sand is deposited for future use in two large silos. Whereas previous procedure required that large flasks be taken to the yard for cooling, returned to the foundry for shakeout and finally stored outside, only one crane trip from the foundry floor to the yard is now necessary.

From the initial to the final step in the new shakeout storage process, events follow in quick, efficient sequence. Flasks delivered to the foundry yard for cooling are picked up by the crane and carried along the crane runway into position in the shakeout cubicle. Electrically-operated doors in the roof and end slide back, permitting the crane to deposit the flask directly on the shakeout deck—an all-steel table surface, 12 x 33 ft, made up of six individual 6 x 10 ft units so constructed that any one unit, a pair, three, four, five or all six can be operated simultaneously.

Each unit is driven by a 20-hp motor through a multiple-V-belt drive. These drives are unique in that the driven sheave hubs are bored off-center in order to allow the center-to-center distance between the driver and driven sheave to remain practically constant while the driven shafts turn eccentrically, due to motion induced by the centrifugal force of offset weights which tend to vibrate both the shakeout deck and its load. The tension on the belts is kept uniform, despite lowering of the shakeout deck under load, by mounting the motors on pivoted bases. When the shafts are rotated, the entire deck vibrates, producing the jolting action necessary to free the sand from the flasks.

Dust liberated by the shakeout operation is picked up by an exhauster, wetted and discharged as wet sludge into a collecting tank.

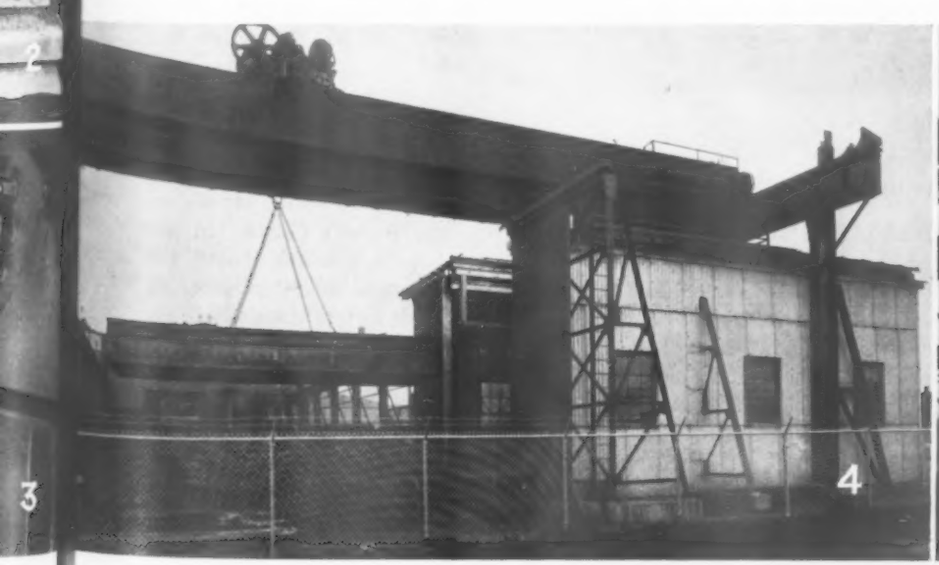
Electrically-operated and interlocked controls for the shakeouts, dust collecting apparatus and sand distribution mechanisms are located in a room adjacent to the shakeout cubicle. A maintenance platform which can be moved back and forth inside the cubicle makes for easy accessibility.

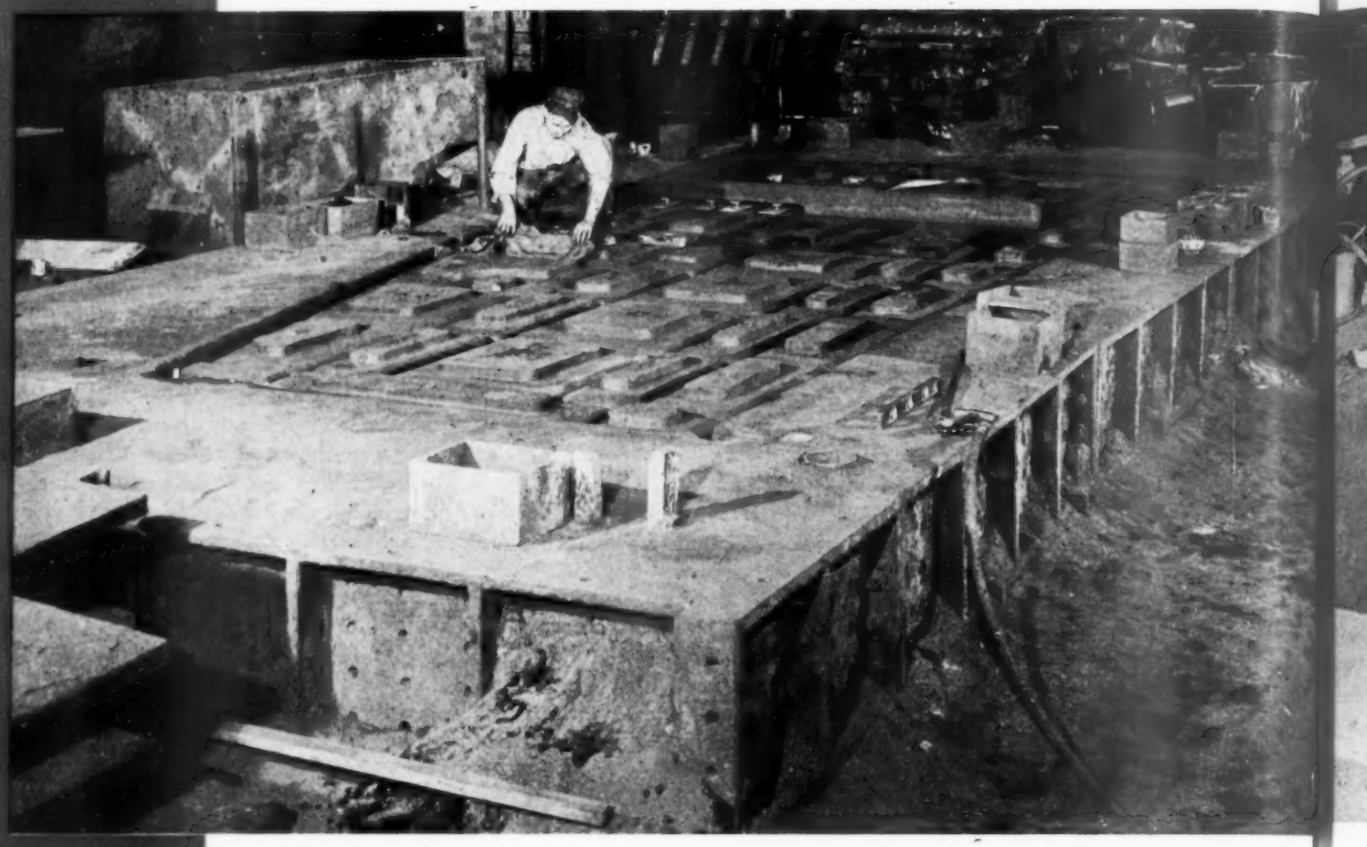
Contrary to previous thought on the matter, large openings in the shakeout grate are not necessary, because hard lumps of baked sand, as large as a man's head and hard enough to support a man's weight, break up readily and pass through 1¼ x 4-in. openings.

The sand from the shakeout grates dumps into hoppers (again six in number) which in turn deliver it to vibrating feeders. By varying the amount of vibration electrically, through half-wave rectifiers, these feeders can be regulated to discharge the sand in any amount, from a trickle to full capacity, onto an underground apron conveyor capable of moving better than 100 tons an hour.

The sand from the apron conveyor is discharged onto a rubber belt equipped with a magnetic pulley. Tramp metal, gaggers, nails, stools, rods, etc., are held in the magnetic field of the pulley until they are carried around far enough to separate from the sand and are then discharged into an accumulating bucket for disposal.

The sand itself is fed into a hexagonal tumbling screen made of heavy metal mesh. (*Please turn to page* 166)





FOUNDRY USES CUPOLA AND DIRECT

by Pat Dwyer

ABOUT two years ago, specifically May 13, 1943, a magazine of wide circulation published a story according to Formula No. 5, *Story Writer's Guide*. In this type of story the hero, through force of circumstances, is confronted with the necessity of performing some incredible feat involving superhuman knowledge, skill, grit and endurance in the face of opposition by the forces of nature and/or the exceedingly active opposition of the powerful villain, the dirty dog under cover at the crossroads. Familiar examples include Hugo's *Toilers of the Sea,* and others extending back in a long line to the Augean stable job of Hercules, and the search for the Golden Fleece by Jason and his crew of hardy Argonauts.

With the natural gift of the true writer, as distinguished from the amateur, the author selected the foundry as the scene of the hero's adventure. Here was a practically virgin field, carefully avoided up to the present for two reasons. Foundrymen familiar with the subject could not, or would not, write. Expert writers knew nothing about

Figs. 1, 2 and 3 illustrate steps in the preparation of a mold for a 100-ton engine bed casting and are typical of the methods, equipment and technique employed in the production of large, heavy gray iron castings

METAL

foundry technique or practice. In their omniscience they assumed that the foundry industry was too insignificant to look into. Our author bravely invaded this strange and unknown territory.

To give his story the proper patriotic touch he had a high-ranking admiral, supported and surrounded by a band of secret service operators, sneak into town to interview the prospective hero with a view of making a 125-ton casting for an armor plate press. Brief personal sketch of iron-fisted Big Mike welded in here to hold and improve reader's confidence. The admiral admitted, and the hero agreed, that a casting of that kind never had been attempted by mortal man either in this or in any foreign country. It was outside the range of practical accomplishment.

Would, or could our hero undertake the apparently impossible assignment?

He would and that was the beginning of the story. He could and that is the middle of the story. And he did, and that is the end of the story!

The 6000 or 7000-word story for which the author no doubt received a handsome honorarium, told how the impossible task was accomplished to the astonishment of the Navy and the enthusiastic admiration of one and all. When the casting was lifted out of the pit the hero nonchalantly cocked his old straw hat over one eye and lighted his ancient and smelly corncob pipe, while the general manager of the plant stepped forward three paces and with a 16-lb sledge hammer hit the casting a severe blow or buffet. The resulting BONG was positive assurance that the casting was perfect!

The whole thing is rather pathetic. As a plain matter of fact, if the Navy needed a 125-ton casting, all the admiral had to do was to mail a blueprint to the Bethlehem Steel Co., Bethlehem, Pa., mark the blueprint *Cast Iron—One Off—Rush,* and his casting would have been made, machined if necessary, and delivered without any fuss or feathers a few days before the specified date.

Heavy castings in almost endless variety have been made for many years in the iron foundry of the Bethlehem Steel Co. An illustrated description of the molding and casting of a 200-ton ingot mold casting was presented in the May 1944 issue of THE FOUNDRY. Great pits are available in the floor. Powerful cranes rumble overhead, capable—as the saying goes—of lifting anything that has two loose ends. If the three large cupolas cannot supply enough metal to pour any given casting, a practically unlimited supply may be furnished from the company's blast furnaces.

Pattern Constructed To Facilitate Molding

The accompanying progress views of the mold for a 100-ton engine bed casting total length 26 ft, width 11 ft, height 8 ft, are typical of the methods, equipment and technique employed in the production of large, heavy gray iron castings. The huge wood pattern smoothly boarded on the outside, braced on the inside and with a skeleton section to form the well for the crosshead, was designed to be molded face down; that is, in the opposite position to that to be assumed by the casting when in service. The boards forming the outside face of the pattern were attached vertically to the frame to prevent any warpage, twisting or overlapping of the joints. The entire face was slightly tapered from top to bottom to facilitate removal of the pattern from the mold. The inside of the mold, an intricate arrangement of transverse and longitudinal ribs, was formed by a number of dry sand cores.

Presence of such a volume of dry sand cores, and the inevitable tendency for the cores to expand when raised to a high temperature, introduced a limiting factor in estimating the proper contraction allowance on the pattern. Experienced foundrymen and patternmakers are familiar with the fact that the usual contraction allowance of ⅛-in. per foot cannot be applied universally to all types and shapes of castings. Obviously, this is a form of knowledge, verging closely on instinct or a sixth sense, that can be acquired only through close study and long experience. In the present instance the shrinkage or contraction allowance on the pattern was 1/10 instead of the usual ⅛-in. per foot. The casting met the specification dimensions.

In preparation for the mold a pit was cleaned out to the proper depth and a layer of coke approximately 1 ft thick was spread over the bottom and pounded down with a rammer. Lengths of 6-in. diameter steel pipe were erected in the corners to provide an exit for the gases generated in the bottom of the mold and from the cores resting on the bottom core prints. Most of the cores also were vented through the top prints which came in contact with the cope. A sand bed was rammed on top of the coke and then the pattern was lowered into place, and with blocks and wedges was adjusted true and level on top, where the upper surface was in the same plane as the upper flange of a heavy cast iron flask frame resting on suitable supports at the floor level. The flask was made up of a number of sections bolted together through vertical adjoining flanges. The flask served as a definite curbing, a guide for establishing the parting line and a support later for the cope. Sand then was rammed under and around the pattern up to the top, where the surplus sand was scraped off flush with the top of the pattern and with the upper flange of the flask.

Sand also was rammed inside the pattern to form the crosshead well in the casting. The outside sand wall was reinforced by steel rods about 2 ft in length laid about 6 in. apart at right angles to the pattern and at every course of ramming. Upright bars and horizontal rods supported the mound of sand in the center. Inside the mound was filled with coke extending down to the coke bed in the bottom of the pit. A strong, coarse grain sand from a New Jersey deposit, highly refractory and with a permeability of 125, was used in the construction of mold and cores.

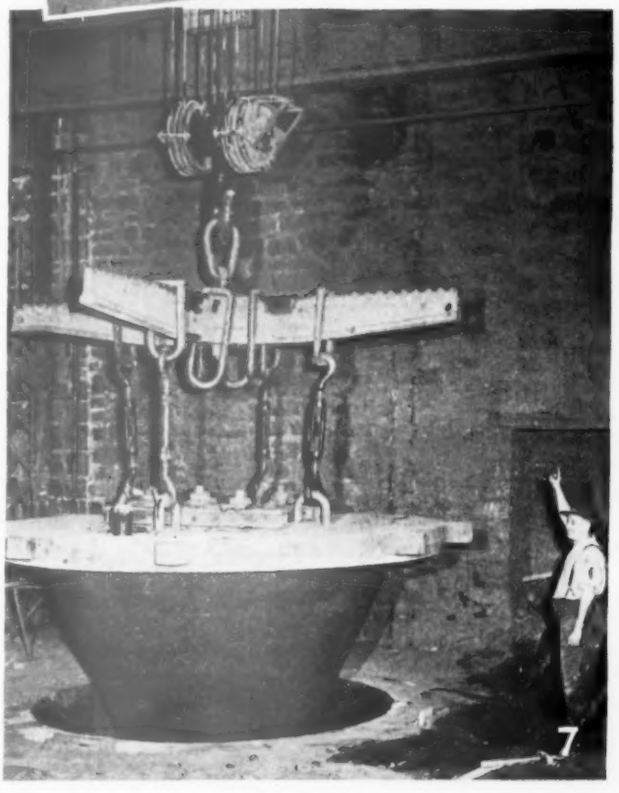
Refractory tile sprues were built up at each end as the ramming progressed. Horizontal branches near the bottom at the center and about a foot below the top terminated in rectangular dry sand cores laid up against the pattern. Each dry sand core had a vertical gate opening 1 x 8 in. and the gates were set in a manner to direct the flow of metal into the principal longitudinal passages between the cores. With this arrangement the mold was filled with metal rapidly and uniformly and with a minimum amount of friction or erosion in any area. Several

Fig. 4—Another view of mold for a large engine bed casting

Fig. 5—Three ladles deliver metal simultaneously to both sides of the mold. Large scrap ingots were converted into cope weights by welding a bracket near the approximate center. A clevis and bolt form the connection between weight and crane hook

Fig. 6—A permanent concrete pit serves as a corebox

Fig. 7—Weight of the core is distributed evenly from a four-way beam



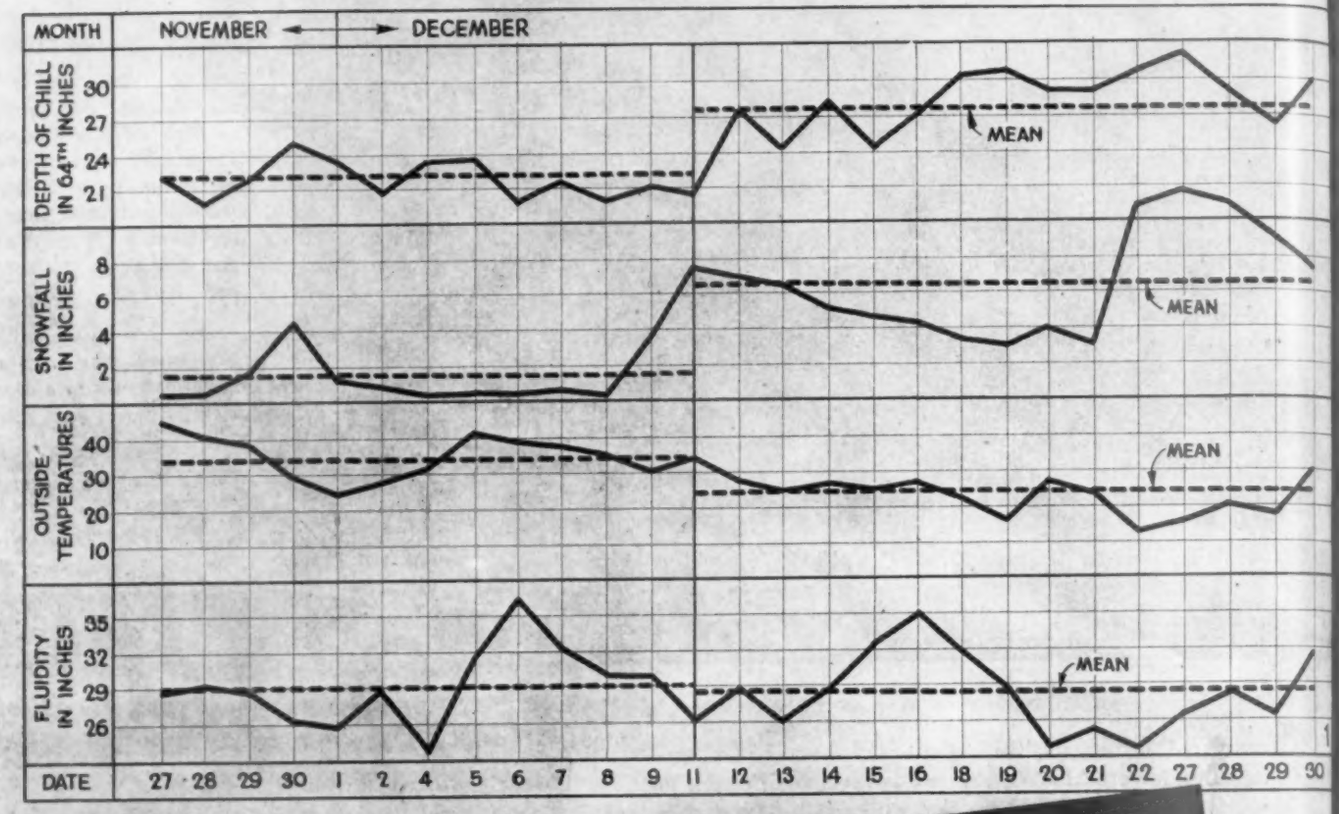
risers, cut in the joint line at the top of the mold and terminating in vertical sprues, served as vents and flowoffs to indicate when the mold was filled with metal.

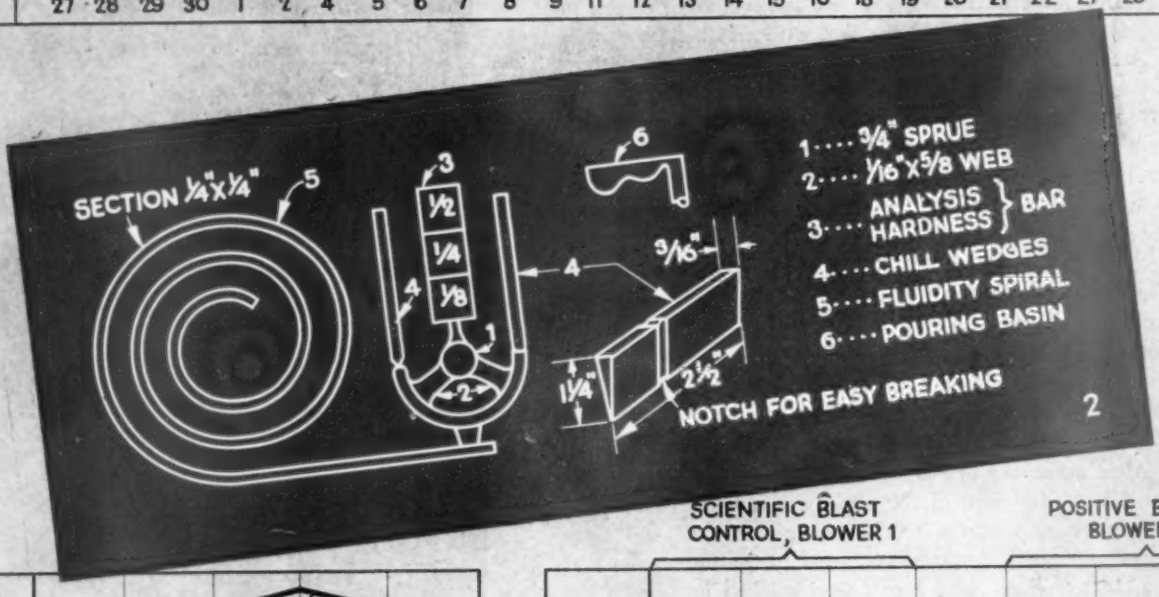
A map painted on the upper, flat face of the pattern showed the position of the cores and guided the molder in setting a gate pin, a rod or a short piece of pipe to form a vent hole over the center of each core print. The cope then was gaggered, filled with sand, rammed and lifted off.

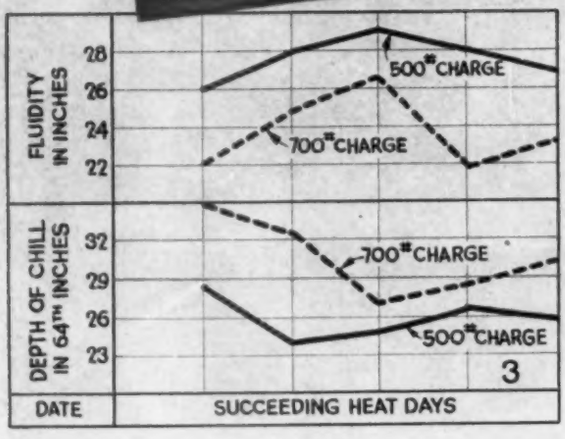
Substantial steel straps attached by screws in recesses provided for the purpose and with toes turned under the bottom, facilitated removal of the pattern from the mold. Turnbuckles suspended from the crane chains were attached to eye hooks which in turn were inserted in suitable holes in the top ends of the steel straps. The turnbuckles were tightened up by hand to start the pattern from the sand bed. Then the craneman applied the power and lifted the pattern slowly and carefully out of the mold.

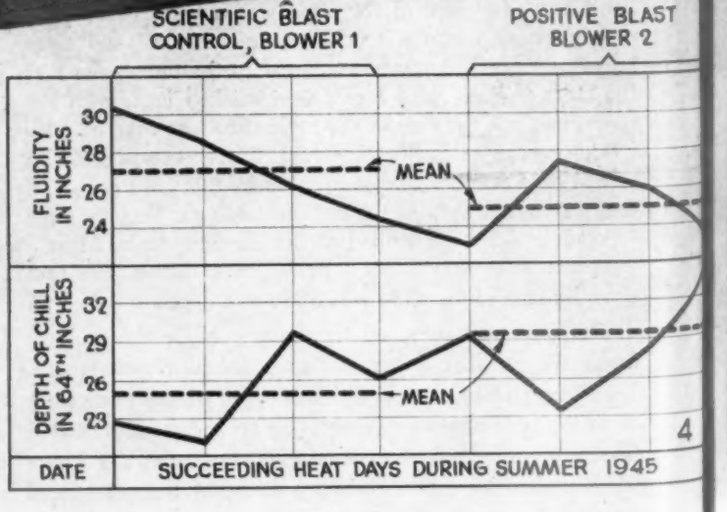
After attending to any necessary minor repairs with the hand tools, the face of the mold was nailed as an added precaution and reinforcement to prevent the sand from buckling or scabbing while exposed to the intense heat of the rising metal. Nail heads were slicked flush with the sand face, and the face of the mold then was covered with a thick coating of carbon blacking. The cope was replaced to rest on a number of cast iron blocks that kept cope and drag separated by about 6 in. Portable gas burners were erected to deliver a stream of hot air into the mold at a temperature of 400 F. for a period of 48 hours. By that time the face of the mold was dried to a depth of 4 to 6 in.

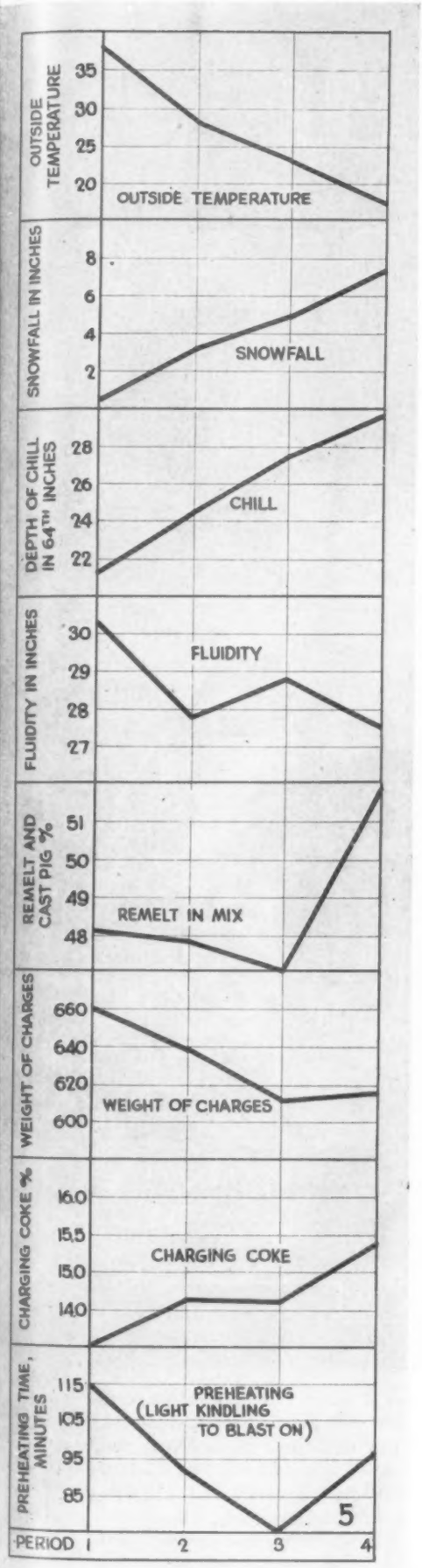
The cope was removed temporarily while the molders fitted the great number of cores accurately in place. *Windows* on the vertical faces of some of the cores kept them the proper distance apart. In other instances double head cast iron chaplets served the same purpose. Old burlap bags stuffed in the openings between the cores, and between the cores and the deep (*Please turn to page* 234)


MONTH
NOVEMBER
DECEMBER
DEPTH OF CHILL IN 64TH INCHES
30
27
24
21
MEAN
SNOWFALL IN INCHES
8
6
4
2
MEAN
OUTSIDE TEMPERATURES
40
30
20
10
MEAN
FLUIDITY IN INCHES
35
32
29
26
MEAN
1
DATE
27 28 29 30 1 2 4 5 6 7 8 9 11 12 13 14 15 16 18 19 20 21 22 27 28 29 30


SECTION 1/4"X1/4"
5
3
1/2
1/4
1/8
4
1
2
6
4
3/16"
1 .... 3/4" SPRUE
2 .... 1/16"X5/8 WEB
3 .... ANALYSIS HARDNESS } BAR
4 .... CHILL WEDGES
5 .... FLUIDITY SPIRAL
6 .... POURING BASIN
1 1/4"
2 1/2"
NOTCH FOR EASY BREAKING
2


FLUIDITY IN INCHES
28
26
24
22
500° CHARGE
700° CHARGE
DEPTH OF CHILL IN 64TH INCHES
32
29
26
23
700° CHARGE
500° CHARGE
3
DATE
SUCCEEDING HEAT DAYS


SCIENTIFIC BLAST CONTROL, BLOWER 1
POSITIVE BLAST BLOWER 2
FLUIDITY IN INCHES
30
28
26
24
MEAN
DEPTH OF CHILL IN 64TH INCHES
32
29
26
23
MEAN
4
DATE
SUCCEEDING HEAT DAYS DURING SUMMER 1945



WEATHER *Affects Chill Depth*

By ERIC WISBRUN

Taylor & Boggis Foundry Division
Consolidated Iron-Steel Mfg. Co.
Cleveland

DURING the severe winter of 1944-45, starting Dec. 12, we noticed an excessive chilling effect in our very sensitive chill wedges for melting and cupola control. The depth of chill in the wedge shown in Fig. 2 increased gradually and became alarming as the days went by. Fluidity spiral and analysis bar, on the other hand, did not show corresponding changes though they were poured from the same ladle in the same mold as indicated in Fig. 2.

Our casting losses, which normally would have been affected by such an excessive depth of chill, remained about the same and the proportion of hard castings, chilled edges, etc., remained as low as before. This tendency was observed for both high-test gray iron and general-purpose gray iron mixtures of entirely different compositions, weight of charges, coke ratio, analysis, depth of chill, fluidity, and physical properties. Only one daily test was poured for the high test gray iron mixtures and four, at regular intervals, for a greater number of charges of general purpose gray iron.

Changes in Practice Had No Effect

All measures taken in the adjustment of composition and analysis, changed provisions for temperature and superheating, and other means of cupola operation known to us for keeping the chilling effect on our iron at a safe minimum, proved of no avail. Since our raw materials are exposed to the weather and have no opportunity to free themselves from adhering ice on their way from the yard to the charging door of the cupola (which holds four charges only) it was concluded that a heavy crust of ice on pig iron, coke, and limestone was responsible for the excessive increase in depth of chill.

Our conclusion was based partly on the fact that identical iron mixtures, containing remelt of unaltered physical properties, chill faster and deeper as their fluidity decreases at the same time. This usually results from lack of temperature, insufficient superheat, or both. As the fluidity in our particular case did not change materially it became obvious that the trouble could not be attributed to improper cupola operation. Graphs in Figs. 3 and 4 illustrate actual cases where lack of temperature and lack of superheat (soaking) resulted in decreased fluidity at simultaneously increased depth of chill. On the other hand, hardly any relation exists between the two curves in Fig. 1 which refer to (*Please turn to page* 174)

Fig. 1—Chart showing how chill depth increases with heavier snowfall and lower outside temperatures

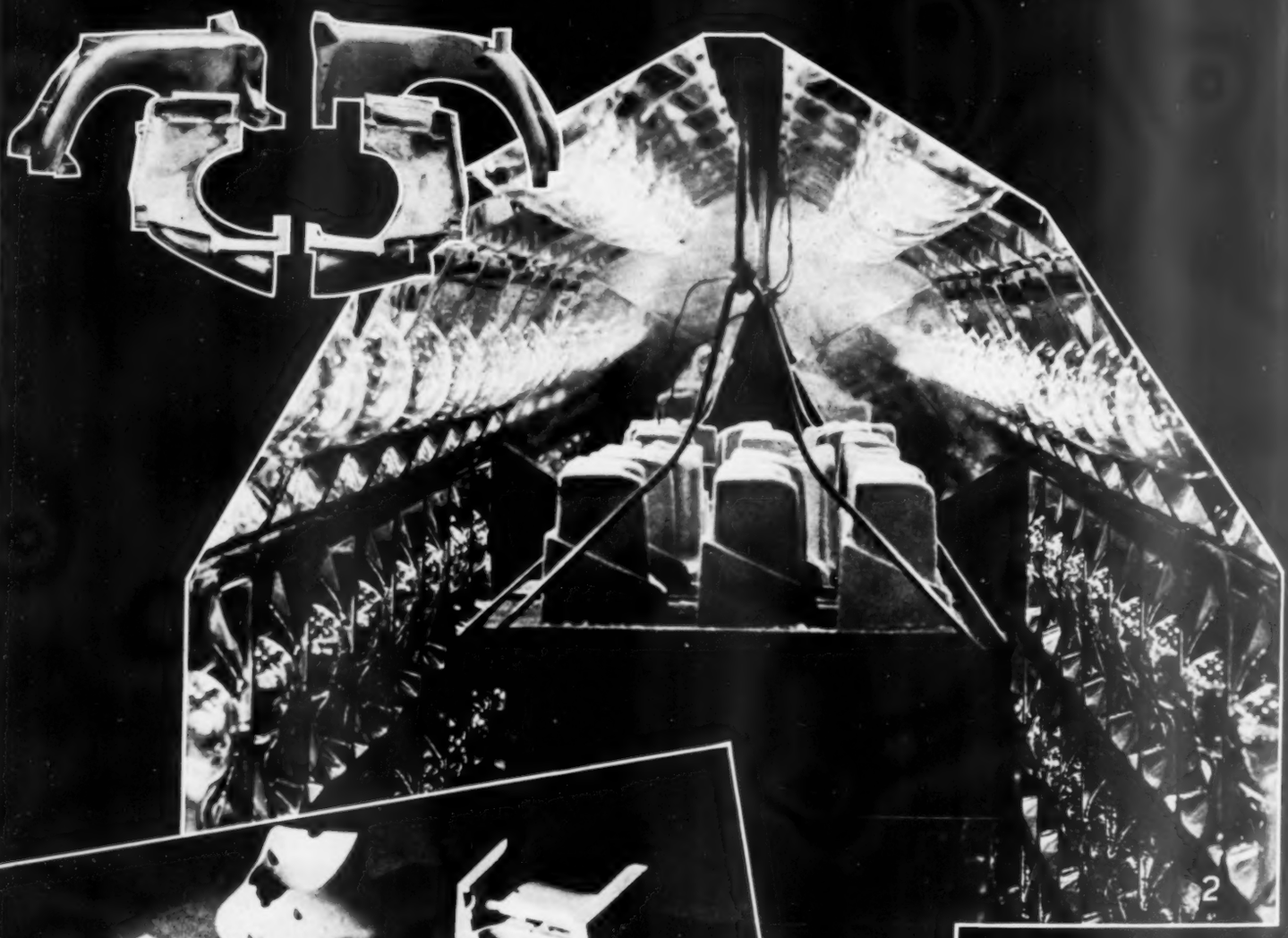
Fig. 2—Test bars for general purpose gray iron used in production of castings varying from 1 oz to 10 lb per piece

Fig. 3—Illustrating how lack of temperature, resulting from adverse atmospheric conditions, causes fluidity to decrease with resulting increase in chill. The same cupola and mixtures were employed, operated by two different blowers

Fig. 4—Lack of superheat for 700-lb charges causes fluidity to be lower and chill to be higher than in 500-lb charge

Fig. 5—Showing relationship between chill depth for different periods and outside temperature, snowfall, fluidity, per cent of remelt, weight of charges, per cent of charging coke, and preheating time

using synthetic resin core binders



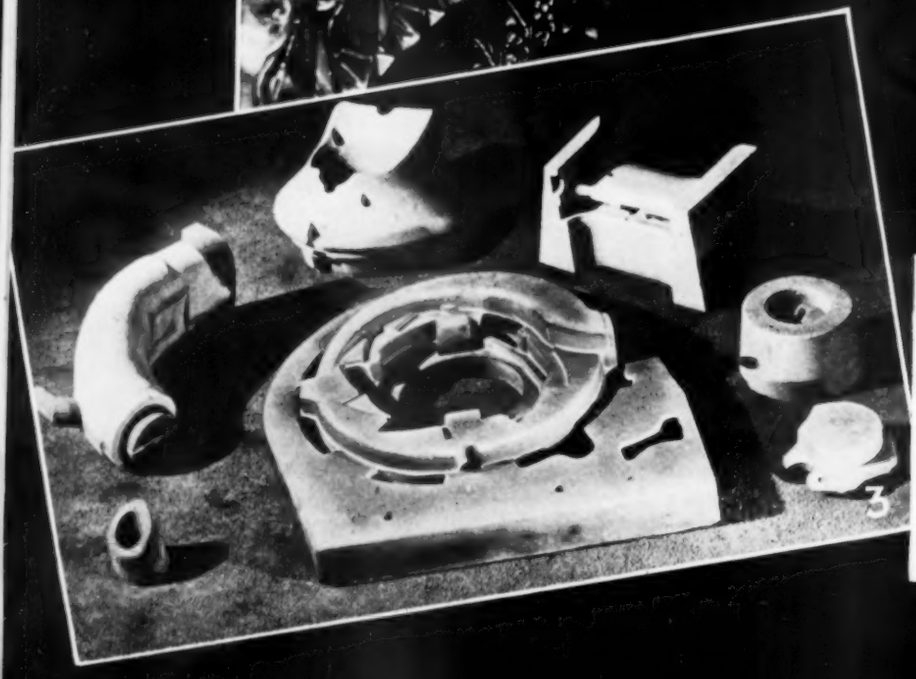


Fig. 1—Oil sump casting and companion core made with liquid synthetic resin core binder. Casting in front cut in half to show smooth finish next to core. Fig. 2—Cores made with liquid synthetic core binder being baked in infra-red lamp oven. Fig. 3—Core assembly for supercharger casting made with liquid synthetic core binder

By H. L. GEBHARDT
United Oil Mfg. Co.
Erie, Pa.

SYNTHETIC resin core binders are heat reactive. They will "set up" or "cure" with oven heat, but they do not require oxygen in baking to develop a bond between the sand grains. A low oven temperature will do, and just enough time to dry the core thoroughly will be sufficient to set the bond. In this case heat is the curing agent, and it is effective at ranges so low that 250 F can complete the action. Heat applied with infra-red lamps can be as effective as oven heat.

Synthetic resin core binders are taken up or dispersed by tempering water in the sand and will migrate toward the surface of the core in baking. As oven heat drives off the moisture, the resins are deposited from a concentrated solution, building up at the surface of the core into a dense, firm bond and leaving the center in a softer or more loosely knit condition. Once brought to a cured state, the film is highly resistant to moisture absorption, is burned out easily with metal heat, and the gas evolved on pouring is low.

Essential difference between natural resins and synthetic resins lies in the fact that natural resins are thermoplastic and the synthetic resins for core work are thermosetting. Synthetic resins strictly are manufactured products, derived from such basic raw materials as coal, air and water. Being thermosetting in type, heat acts as a curing agent, converting the resin to a hard glass-like substance which cannot again be remelted without destruction.

More than 20 different broad types of synthetic resins are being made today, and several of these could qualify as proper for core work; but the types most generally in use are urea-formaldehyde resins. The name of the resin in this case indicates the materials from which it is produced, urea and formaldehyde. Urea is made from ammonia and carbon dioxide, while formaldehyde results from a combination of carbon monoxide and hydrogen.

Life of Resin Varies With Conditions

When these resins finally are processed for service in the coreroom, it is important that liquid resins be held to close tolerance on total solids, to definite standards for free formaldehyde, and to a pH which will provide good storage life. Liquid resins "age" on standing, especially in warm weather, and usually are processed to a useful storage life of 90 days. Powdered resins can be extended with the addition of various types of cereal binders. Certain of these will favor migration and tend to build up surface hardness in the core, while others which are less water soluble will help build up center strength. Other additives, pointing toward clean action in the corebox, may include certain stearates or stearic acid or fly ash. Powdered resins, if kept completely dry, will have indefinite storage life.

One large foundry concerned with the casting of both aluminum and magnesium has used both liquid and powdered urea-formaldehyde binders for the past two years. With urea-formaldehyde core binders it has been possible to produce cores with hard surfaces and weak interiors, yet strong enough to be handled during subsequent coreroom and foundry operations and weak enough to result in good collapsibility. Also, lower temperatures are required for baking, and therefore the loss of inhibitor is not experienced. Even though at times it is necessary to spray the cores with an inhibitor, this is not the fault of the binder or baking temperature, but is necessary because of the nature of the casting.

Further experimentation with synthetic binders led to the use of potassium, sodium and ammonium fluoborates as the inhibitor, replacing boric acid completely and the sulphur from 50 to 100 per cent. The combination of fluoborates and urea-formaldehyde binders has resulted in cores with a hard surface which does not rub off—cannot be penetrated. They also have a soft interior so that cores can be removed with little effort, retain the advantage of low baking temperatures—350 to 365 F—and also permit higher baking temperatures without destroying the inhibiting effect of fluoborates.

Experience has shown that when fluoborates are used, the urea-formaldehyde binder content has to be increased slightly. At the present time fly ash, corn flour and southern bentonite are used as other additives to the sand mix. Fly ash imparts a finer surface and increases green strength somewhat. Southern bentonite in amounts not greater than 0.125 per cent imparts added green strength and no appreciable dry strength. The corn flour is used for both added green and dry strength. This foundry currently is using three mixes based on synthetic binders which are shown in Table I. They are used for magnesium castings, but the sand mixes for aluminum castings are the same except that the inhibitors are omitted.

Experiment With Binder Combinations

In mixture No. 1 the synthetic binder was varied from 1 to 5 pints for mix with and without other internal binders. The mix resulted in cores varying from those which had a good surface and weak interior to those which were extremely hard throughout. In mix No. 2 the binder was varied from 3/4 to 2 lb with and without other additions. Chief advantage found over mix No. 1 was consistency. Mix No. 3 results in a core for use on sump castings or on light structural castings which require large cores with thin metal sections. Majority of cores in this foundry are made with liquid binder due to the cost factor involved.

Another foundry which has maintained heavy production schedules in casting magnesium uses both liquid and dry types of synthetic resin core binders. For keeping mixed sand in a clean working condition ½-gal of kerosene was added to 1000 lb of sand. In listing the features of synthetic core binders in order of importance, this company rates knock-out first, low baking temperature second, and fast oven output third. Sand mixes shown in Table II represent the best efforts in adapting synthetic resin binders to present coreroom practice. In mix No. 1 the sand, chemicals and corn flour are mulled 2 minutes; then the liquid synthetic binder and water are added and mulled 8 minutes more, or a total mulling time of 10 minutes. In mix No. 2 the zirconite sand, dry synthetic binder and chemicals are mulled for 3 minutes followed by the addition of water and mulling for 12 minutes. Total mulling

time is 15 minutes for entire mixing operation.

In mix No. 3 the sand, chemicals dry binder and cereals are mulled 2 minutes, after which the water is added and mulling continued for 8 minutes, giving a total mulling time of 10 minutes. In mix No. 4 sand, chemicals, and corn flour are mulled 2 minutes. Then the liquid synthetic binder and water are added, followed by mulling for 8 minutes, or a total mulling time of 10 minutes. Mix No. 5 is for jacket cores.

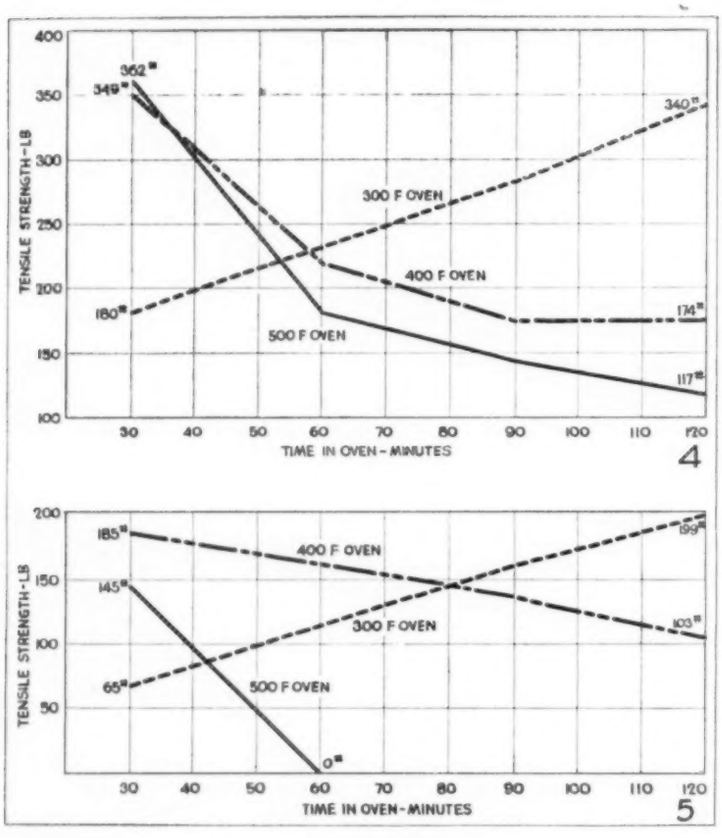


Fig. 4—Chart showing behavior of liquid synthetic and dextrine mix with protracted timing at three oven temperatures. Cores were made with 1 per cent by weight of a synthetic liquid core binder to which 1 per cent of dextrine was added

Fig. 5—Chart showing how tensile strength of liquid synthetic binders varies with heat and timing. Core sand and resin binder were mixed in a weight ratio of 100 to 1

Another large foundry producing magnesium castings tried both liquid and dry types of synthetic resin core binders and decided that the liquid type showed better value for its work. Sulphur and boric acid are used as inhibitors. In commenting on coreroom practice in the use of liquid synthetic binders it was noted that moisture content in the sand could be critical for certain sand mixes. For normal use 3.5 to 4.0 per cent water seems to give the best results with the sand being used. Six per cent water gives longer life but lower initial properties. Blow sand is used at 2 per cent water; however, more resin is required and the mix must be used in 4 to 8 hours. No fly ash, kerosene or similar materials are used to promote better workability in the corebox.

Procedure involves wiping the box out after several cores are made, or spraying with a waxy type of liquid parting after every few cores. As a precaution against air drying, the core sand held in hoppers over the core machines is kept covered with wet bags or a tight cover. Crusting is not considered troublesome with this procedure. However, there is a tendency for the sand to "cure" during the handling cycle. On this subject the following is mentioned. The "setting up" or condensation of the resin is one of the worst things to be contended with. Considerable sand is thrown away and most soft cores are traceable to that cause. Speed of reaction doubles for every 10 F rise in temperature. Time limit is 3 hours at 100 F; 6 hours at 90 F, and 12 hours at 80 F. Exception to the rule is that sand never is kept beyond 16 hours regardless of temperatures. The comany found in earlier work that 25 to 30 per cent dextrine based on the synthetic resin content was an excellent additive to the sand mix and that the cores were moisture proof.

Through numerous tests made on the amount of free formaldehyde in its liquid resin binder the firm found that 5 to 6 per cent developed the best cores. As little as 2 per cent leaves the binder too susceptible to fast curing at room temperature. It also was observed that a binder containing a low free-formaldehyde content did not migrate well or give such a hard surface to the core as the 5 to 6 per cent grades. This proved important, as the standard for core hardness was 96 at the surface of a tensile core and less than 85 at the center.

If free formaldehyde is present in the resin to the amount of 10 per cent, it is good practice to add 10 per cent crystalline urea to the sand mix, proportioned on the solids content of the resin. If free formaldehyde is on the low side, half as much will do. Most urea-formaldehyde resins in liquid form contain smaller or larger amounts of free formaldehyde, and the crystalline urea addition is intended to pick up excess free formaldehyde which is given off in the mixing operation, and to that extent reduces the fumes and odor which otherwise would be given off at the mixer. It will not necessarily build up any additional bonding value in the finished sand mix.

To improve workability of the sand and obtain cleaner draws from the corebox one aluminum foundry developed the use of fly ash. It was found that the inherent stickiness of urea formaldehyde could be corrected partially by addition of 1 to 5 per cent of fly ash, based on the weight of sand. When fly ash is used (for aluminum) it has also appeared desirable to add boric acid in amounts for ½ to 1½ per cent by weight to maintain the optimum pH for the binder. Boric acid added alone to the sand mix can act as an accelerator, materially shortening the storage life of the mixed sand; but if fly ash is added, its alkaline qualities will neutralize the boric acid. The combination of boric acid and fly ash therefore can act as a control, fixing the pH of the binder slightly on the acid or alkaline side to suit whatever conditions are to be dealt with. Cores made with such mixes tend to be somewhat more brittle than when the two extra ingredients are not added. Boric acid also has been blamed for a (*Please turn to page* 198)

Organization of the FOUNDRY INDUSTRY in FRANCE

By VINCENT DELPORT
European Manager
THE FOUNDRY

SHORTLY after the occupation of France by the Germans, the Vichy government promulgated a decree, dated Aug. 16, 1940, covering the organization of various industries and trades into so-called "Committees of Organization." Concurrently, the existing employers' federations were dissolved. The object was to bring about a more strict control of the government over industry by setting up an organization that would act as liaison between industry and the state. Such was the original function of the Committees of Organization.

Thus the foundry industry was called upon to form a Committee of Organization and this was done largely through the co-operation of the Syndicate General des Fondeurs de France, the then-existing employers' organization, which contributed the majority of its personnel to form the new committee.

In December, 1944, the constitution of the Committees of Organization was modified and the name of Offices Professionnels was substituted for the old one. The Office Professionnel comes directly under the control of the State, which is represented by a "Commissaire du Gouvernement," or government delegate playing the part of a controller. The Office Professionnel receives its instructions from the government through the commissaire and transmits them to the members of the industry. It is bound to place the national interest before the interests of the members of the industry. At the same time, the employers' organizations have been allowed to reconstitute themselves, and their part—as in the past—is to represent and protect the interests of their members.

Consequently, the organization of the foundry industry comprises (a) an official body, the Office Professionnel de la Fonderie, which depends from the Ministry of Industrial Production through the "Direction Generale des Industries Mecaniques et Electriques," (b) a non-official body representing trade interest: the Syndicat General des Fondeurs de France, divided into regional groups and trade groups. The Office Professionnel is financed by means of a levy on pig iron and scrap, which is compulsory. The Syndicat General des Fondeurs de France is financed by means of a subscription from its members, based on labor and wages, and membership is *not* compulsory.

The government appoints its own commissaire or controller at the head of the Office Professionnel de la Fonderie, which is managed by a "delegue" or assistant controller. One of the main functions of the office is to allocate raw materials between members of the industry, subject to quotas that are themselves allocated by so-called "Offices de Repartition"; f.i. the O.F.F.A. or Office de Repartition des Fers, Fontes et Aciers, allocates an overall tonnage of pig iron to the ironfoundry industry, and the Office Professionnel allocates this tonnage to the foundries. In a similar way, coke will be allocated to the foundry industry in general by the Office de Repartition des Cokes and the Office Professionnel de la Fonderie allocates this tonnage to its members. The Offices de Repartitions come directly under the Ministry of Industrial Production.

Another function of the Office Professionnel is to control the various sections into which the industry is divided, and to encourage the formation of such trade sections where they are found necessary or worth while.

The Office Professionnel also transmits to the Industry the instructions and policy of the government, and receives the complaints or recommendations from the Syndicat General des Fondeurs, and conducts negotiations on such matters so as to arrive at solutions mutually satisfactory as far as possible.

The Office Professionnel de la Fonderie is divided into three main sections:

(1) *Ferrous Castings,* comprising rainwater pipes and fittings, castings for the building trade (cookers, radiators, sanitary castings, etc.), engineering castings (for machine tools, automobiles, railroads, etc.), malleable castings and steel castings.

(2) *Nonferrous Castings,* comprising light alloy castings (aluminium and magnesium alloys), bronze and brass castings, and die castings.

These two sections are engaged solely in the allocation of metallic raw materials to the various sub-sections that they cover.

(3) *Ancillary Section,* which deals with the allocation of foundry requisites, lubricants, workmen's clothes, etc., to all the various sections and subsections of the industry. The ancillary section also deals with coke and other fuels, costing and statistics.

The industry is also divided into a number of trade groups, that come under the supervision of the Office Professionnel. Existing groups comprise: steel castings, malleable castings, light castings (principally heaters, radiators, etc.). A further group is in formation to cover jobbing foundries making castings (a) for the automobile industry, (b) for machine tools.

The function of these groups, known in France as "ententes," is principally to take care of the relations between the foundries they (*Please turn to page* 226)

Has Trouble with Chill Blows

Q.—We believe that you have covered references to a suitable material for painting chillers in past issues, but we do not seem able to locate them. We have trouble with both external chills and metal inserts due to blowing. We find the chief cause of blows on both chillers and inserts is the accumulation of moisture when those metal parts are left in the mold for a short period before pouring.

A.—Since you know the cause of the blows from chills and inserts—moisture condensation—it should not be too difficult to eliminate the trouble by some slight changes in practice. Cause of moisture condensation is the large temperature gradient or differential between the sand and chill, and we do not believe that any coating, applied in the usual thickness, will be of any help. While a thick coating would probably have some insulating value, it would defeat the purpose for which the chill is used. In the case of an insert a heavy coating would prevent the fusion or partial fusion of the piece by the molten metal.

Condensation of moisture can be eliminated by having the chills and inserts at the same temperature of or, perhaps better, slightly warmer than the sand in which they are placed. If a coating of any kind is applied, it will be necessary to dry the chills in a core oven unless the chills are sufficiently hot from previous use—which is not likely in your case. The chills should be left in the oven until just before use, or removed only sufficiently far enough ahead so that they can cool down to handling temperature.

You do not mention your procedure in handling chills and inserts, but it may be pertinent to point out that the prime essential is a clean surface on those items. Previous to use they should be abrasive blasted or tumbled until all dirt, rust, etc. is removed. The chills then should be coated with some material which will keep the surface free from dirt and oxidation. Some foundrymen use proprietary materials while others employ foundry blacking, talc, mineral oil, etc. After the coating is applied by dipping, painting, swabbing, etc., and allowed to drain to remove the excess material, the chill is placed in a core or similar oven until the coating is absolutely dry.

You also might be interested to know that many foundrymen have found less difficulty with chill blows when the surface of the chill is cross-hatched with shallow, narrow grooves rather than being smooth. Naturally with such chills the surface of the casting is somewhat rough, and will require grinding or machining.

Questions and Answers

Might Combine Two Operations

Q.—Have you any information on a new pickling process for the quick aging of green iron castings?

A.—We do not have any information on a pickling process for the purpose of quick aging. However, there are two procedures designed for cleaning iron and steel which might function in the manner you have in mind since they both involve operation at elevated temperatures. Both processes involve molten salt baths in which the objects to be cleaned are placed, and operate under 1000 F.

One method which is used in the cleaning of iron and steel castings for the purpose of obtaining good adherence of babbitt linings, brazing metal, etc., employs what is termed a molten oxidizing salt bath followed by a water solution of a salt reducing bath and a hot water rinse. The other, designed for the replacement of the usual acid pickle of wrought steels, uses a molten caustic soda containing sodium hydride.

Ingot Surface Is Discolored

Q.—We are making brass ingots weighing about 25 lb each, and are having trouble with discolorations around the outside surface. We have tried lampblack, shellac, greases, etc., but do not seem to be able to eliminate the discolorations. Can you give us any suggestions which might enable us to get a clean surface?

A.—You do not mention how you handle the ingots after pouring, and it would be our guess that the discolorations on the surface might arise from two conditions. One is the type of mold coating or wash that you are using or have tried, and the other is the cooling procedure. The shellac, greases, oils, etc. which you mention as mold coatings, in our opinion tend to burn onto the surface of the ingot and leave black to brown deposits or films which, while not affecting the metal composition, do not enhance its appearance. The other possible cause is oxidation due to exposure of the hot metal to the atmosphere during cooling.

Since the mold coating primarily is applied to protect the mold surface from the erosion of the hot metal stream and to prevent the ingot from sticking after it has cooled, it is advisable to employ a refractory type coating rather than a carbonaceous one, and it is suggested that you try

a thin slurry of bone ash, lime, clay, etc. Mold, of course, must be hot enough to dry the coating before pouring in the hot metal. Coating also should be as thin as possible, since if it is thick it will tend to flake off and become enmeshed in the metal. After pouring the ingot it is allowed to cool until it is practically solid throughout. The condition can be determined visually without much difficulty. Then the still hot ingot is dumped into a tank or pit full of cold water. Steam generated cleans the surface, and the water cools the ingot as well as eliminates exposure to the atmosphere.

Improve Quality of Grate Bar

Q.—We have to make some grates for our school boilers and would like to improve the quality by the addition of nickel and chromium. Should steel scrap be used in the charge, and to what extent? The cupola to be used is lined to 24 in., and the charge is made up to 150 lb pig iron and 350 lb scrap and remelt.

A.—To receive full benefit of any alloy additions the base iron must be of suitable quality. Since you do not give the analysis of the pig or scrap, we cannot suggest a cupola charge in pounds. The following composition is recommended for grates and stoker parts: Si 1.40 to 1.60 per cent, Mn about 0.60 per cent, total C 3.20 to 3.40 per cent, Ni 1.25 to 1.75 per cent and Cr 0.50 to 0.70 per cent. Steel is a beneficial material in a wide range of mixtures for various purposes, and for grate bars it is suggested that you include from 15 to 30 per cent. Since it contains hardly any silicon, the lack must be compensated by use of a higher silicon pig iron, or by addition of ferrosilicon to the charge or to the ladle. Small briquets containing a definite amount of silicon are available for that purpose, as well as similar briquets containing other alloys.

Mold Coating Causes Trouble

Q.—We are having considerable trouble with the coating of molds on centrifugal castings. We are using a mixture of silica flour and bentonite in the ratio of 10 to 1. It works out satisfactorily as far as the castings are concerned, but we have excessive wear on tools in turning the outside of the bushings. It appears that the silica flour burns into the metal for a considerable depth, causing the tool wear. We are using cast iron molds and pouring both gray iron and bronze centrifugally. Melting temperatures are 1950 to 2050 F for the bronze, and 2400 to 2500 F for the gray iron.

A.—Mold washes or coatings are employed for several purposes in centrifugal casting. Principle use is to protect the metal mold surface from erosion or cutting by the hot metal stream while others include a means for easier removal of the casting, to fill up fire cracks or other defects in the mold face so that a smoother surface is obtained on the casting, and as a means for controlling cooling rate. The silica flour-bentonite coating was recommended by Fox in application to centrifugal casting of bronze where chilling was not a critical part of the process. Where chilling is important he suggests a coating of colloidal lead and graphite. Presumably by colloidal lead he is referring to finely divided graphite supplied in a water or oil suspension.

Zuehlke states that he found a coating of dry bentonite blown into the metal mold while it was rotating previous to pouring, aided in obtaining a smooth surface on bronze and brass castings since it tended to fill small fire cracks and other discontinuities in the mold surface. Only a small amount should be used, and the mold should be blown out previous to its next cycle of use. Falk stated that he found a spray composed of dilute refractory cement, core oil and graphite gave good results in centrifugal casting of gray iron. Presumably some proprietary coatings for permanent molds are available which will serve satisfactorily on centrifugal molds since they are used for the same purpose.

While you mention that the wear on tools appears to be due to the mold coating adhering to the castings, we wonder if you have made a careful examination to verify that statement. In this we are considering that the trouble may only be encountered with the gray iron. If it also applies to the nonferrous castings, then that probably is the cause. In the case of the difficulty only applying to gray iron castings, the trouble might be due to too great a chill resulting in a white fracture skin. If such were the case, the trouble could be overcome by an annealing treatment, or possibly the application of a heavier coating of mold wash which would act as an insulator. However, thick coatings may flake or chip off, resulting in a surface which is far from smooth.

If the difficulty is due to the coating adhering to the castings, it would seem that it is due to the metal penetrating into the coating. The only suggestion we can make to alleviate the problem without changing the composition of the coating is to try lower pouring temperatures. The centrifugal casting process due to the added force generated by centrifugal action tends to increase the penetration proclivities of molten metal.

GANGWAY! By J. A. Patterson

"Sure, we gotta hire back ex-soldiers, but how come all of my helpers has been replaced by men and you still got all dames workin' for you?"

Describe Processes for Coloring Aluminum

Q.—Could you give us any information on the chemical coloring of aluminum? We recall seeing some mention of it previously, but cannot seem to locate the reference.

A.—Coloring of aluminum and its alloys is being accomplished commercially, but it is our recollection that some of the phases are patented, and we suggest that you look into that situation before going beyond the experimental stage. Coloring involves a number of operations of which the first is the polishing, buffing, abrasive blasting, scratchbrushing, etc. depending upon the final desired appearance. The piece then is cleaned to remove any grease and subjected to an electrolytic anodizing or oxidizing treatment which develops a reasonably heavy oxide coating on the surface.

The coated object is removed from the anodizing bath and colored by any of the following procedures: By immersion in a dilute dye bath of the desired color. By pickling in an organic salt or acid, sodium borate, ammonium phosphate, etc., and then immersing in a basic dye. Third method employs inorganic pigment materials and usually involves double coating. For example, the object is dipped in lead acetate followed by potassium chromate or dichromate will give a yellow color; orange is developed with potassium antimonyl tartrate following by hydrogen sulphide, etc. Colors are sealed in place by boiling in hot water or applying wax coatings.

It is claimed that one drawback to use of organic dyes for coloring is the tendency to fade after a time similar to dyed fabrics. Pigmented coloring is said to be more permanent, but the colors are not near as brilliant, and the range of colors is not nearly as great.

Gives Fuel Consumption For Various Methods

Q.—Do you have any information on the fuel consumption for different firing methods in the annealing of malleable iron?

A.—While some figures are available, it might be pointed out that they only are averages, and hence, only should be used for rough comparisons since the actual consumption figures may vary widely from plant to plant. Also much will depend upon the construction of the furnace, particularly whether or not it is designed to burn a specific fuel, size of the heats to be annealed, etc. Another factor is whether or not pots are employed to protect the castings from the furnace atmosphere. Still another would be the length of the annealing cycle not to forget the holding temperature and the length of time at that temperature.

With those considerations in mind the following *average* consumption figures might be used on which to base rough estimates: For hand-fired ovens coal consumption is about 1000 lb per ton of castings. With powdered coal fired ovens the fuel consumption is around 500 lb per ton of castings. In oil-fired, muffle-type ovens the fuel consumption is between 45 to 50 gal per ton of castings while in the open-flame type oven oil consumption ranges from 80 to 90 gal per ton. In gas-fired ovens consumption is 5000 to 6000 cu ft of 1000 Btu gas. Electrically heated ovens show an average consumption of 475 kwh per ton of castings. To obtain more definite figures it is suggested that you get in touch with the various manufacturers of annealing oven equipment.

Supplies Basic Data on Precision Molding

Q. — We are interested in precision molding, and would like to have some information on the methods employed.

A.—Essentially precision molding or as it commonly is termed, investment molding, involves the use of an expendable pattern of wax or plastic and a jointless mold of a material whose linear expansion and contraction at various temperatures is known. Mold material will depend upon the pouring temperature of the alloy being used and ranges from practically all silica in the case of steels and other alloys poured at high temperature to gypsum cement or plaster of paris for brasses, bronzes, aluminum alloys, etc. whose pouring range is under 2400 F.

The expendable wax or plastic patterns are made in dies into which the material is forced under pressure. Die impression accurately made is of such size that all shrinkage or contraction factors of alloy, mold material, etc., are compensated, and the resulting casting held to a tolerance as low as 0.005-in. in many cases. Usually a number of patterns are joined together by a gating system and placed in one mold. Previous to insertion in the flask the patterns are sprayed with a solution of ethyl silicate containing a wetting agent, and fine silica flour is dusted over the assembly. The assembly is allowed to air dry, and placed in the flask. The mold backing material composed of silica mixed with ethyl silicate as the binding agent to form a slurry is poured into the flask. The whole is vibrated to pack the mold material around the pattern assembly.

After air drying the mold is placed in a furnace in such a position that the wax can run out, and the temperature gradually increased until the mold reaches a temperature of 1400 to 1600 F and all traces of wax and carbonaceous material have been burned out. Then the mold is removed from the furnace and the molten metal or alloy poured in. With some high melting point alloys a small indirect arc electric furnace mounted on trunnions is used as the melting unit. The hot mold is clamped over the pouring spout while in the top position, and then the furnace is turned over to permit the metal to flow into the mold with or without additional pressure applied through an air line attached to the furnace. Also in some cases the hot mold is mounted on a centrifugal machine and the metal poured in.

In the case of gypsum cement or plaster of paris molding materials the practice is slightly different in that the gypsum can be poured directly around the pattern without any preliminary operations. Drying or baking temperatures need not be quite as high although removal of the last traces of wax and carbonaceous material require a high temperature. For further details on precision casting we suggest that you study the following articles: "Precision Castings" by D. Basch and L. L. Wyman which appeared in the Feb. 1944 issue of THE FOUNDRY, and "Precision Casting by the Investment Molding Process" by R. Nieman which appeared in Vol. 52 of the *Transactions* of the American Foundrymen's Association (1944).

Produce Abrasive Faced Nonferrous Castings

Q.—We are experiencing some difficulty with our castings, and would like to find a solution. The castings are abrasive faced aluminum alloys and bronze castings, and we find that the abrasives are not fusing to the alloys.

A.—You do not mention your present practice in producing the abrasive faced castings so it is difficult to offer any suggestions on what might be done to insure the abrasive adhering to the casting face. General practice is to coat the mold face with a thin layer of adhesive material such as water glass (sodium silicate), clay wash, molasses water, etc., and then carefully sieve on a thin layer of the abrasive. Screen or riddle used for the purpose should be of the same mesh as the abrasive as that permits spreading of a uniform layer. Some times it is advisable to spray another coat of the adhesive over the abrasive and apply another layer of abrasive.

Then the face of the mold is dried to insure elimination of any moisture so that the molten metal will lie quietly

(*Concluded on page* 118)

☆ ☆ *Nickel*

ASSURES CONSISTENTLY BETTER CASTINGS

Large or small . . . for all castings in which your customers demand improved physical properties, increased pressure requirements or greater wear resistance . . . Nickel will help you satisfy these demands.

Nickel also serves as a valuable tool within the foundry itself by alleviating such problems as porosity, shrinkage, chilled corners and edges and non-uniformity in castings of irregular section or unusual design.

Suitable forms of Nickel and Nickel alloys have been developed to simplify its use by both ferrous and non-ferrous foundrymen.

★

Our technical staff and the casting specialists of our distributors have had many years of experience with foundry problems. They will welcome the opportunity to cooperate with you.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

(*Concluded from page* 116)
against the mold face. The metal should be poured quite hot to insure good fluidity so that it will penetrate between the abrasive grains and hold them in place. In case of bronze, it may be found advantageous to use more phosphorus than for strictly deoxidizing purposes. The increase in phosphorus content produces a phosphor bronze which is noted for its tendency to creep or penetrate.

Foundry Planning Calls For Careful Study

Q.—We are planning to build a foundry and would like any book or information you may have so that we could have a file in the office for reference.

A.—So far as we are aware there is no book devoted to the subject of foundry planning. From time to time articles in THE FOUNDRY have described typical foundries and included sketches showing the arrangement of equipment. However, you failed to mention whether gray iron, steel, malleable iron, aluminum, magnesium, brass or bronze castings were to be made, or to give any idea of the size of the proposed foundry either in tonnage or number of molders. Hence, we cannot suggest what issue of THE FOUNDRY might contain a suitable description.

Since many factors enter into the proper planning of a foundry so that the castings may be produced most profitably, it is wise to secure the services of firms which through specialization have had long experience in that field. There are a number of foundry engineering firms, and their names and locations may be found in the advertising pages.

Small Risers on Casting Fail in Feeding

Q.—We are making gray iron ring castings which are 37 in. outside diameter, 14 in. inside diameter, and 4 in. thick, and are placing two 5 in. diameter risers in the center of the ring, opposite each other. Risers are churned until the metal becomes solid, but after they are broken off we find shrink holes at the junction of risers and casting. We are using a mixture of 45 per cent machinery scrap and 55 per cent pig iron.

A.—Risers on your casting are too small and form a detriment rather than a help. Even though they are kept open some time by churning, they freeze before the casting does. The metal in the casting continues to shrink and since there is no metal being supplied, the shrink appears under the riser. To function properly the riser should be large enough to maintain the metal in a molten condition as long as that in the casting. In the present condition that means a pair of risers about 12 in. diameter and 10 in. high.

For convenience in removing the riser may be necked down to about 3 in. diameter. Use of a ring core about 1½ in. thick between riser and casting will aid considerably in delaying freezing at that point. Rod feeding is not necessary if the top of the riser is covered with some insulating material such as charcoal, blacking, dry sand or one of the proprietary materials made for that purpose. If the casting is not required to meet any specification, or be subjected to machining, etc., it can be made satisfactorily without any risers. It will shrink uniformly since it is of uniform section, but the center will not be as dense as the outside. Method of gating is immaterial. Metal may enter through a basin and three 1-in. pop gates on top; through a single sprue and four branch gates in the center, or through a deep narrow single gate in one corner of the flask. Unless there is some special reason, the proportion of pig iron in the mix seems to be unusually high for a casting of this kind.

Under Normal Conditions Silica Goes to Slag

Q.—Can you tell us whether a limestone containing 8 to 10 per cent silica loses all or part of that compound to the iron during the melting process in the cupola?

A.—Provided the slag is not sticky or viscous, there is no reason why silica should be picked up by the iron from the limestone or slag in cupola operation. Some are of the opinion that with sticky slag the iron is not cleaned properly resulting in some silica being retained by the iron. However, appearance of such a slag is rare since a little attention to the amount of stone charged in relation to the condition of metal charged generally produces a fluid slag.

It seems to us that the stone is rather high in silica. Main reason a high lime or lime-magnesia stone is desired in fluxing operations is to obtain efficiency and economy. Lime and magnesia of the stone combine with silica to form a silicate slag or glass. Hence, if a stone is high in silica, part of the lime is required to flux or combine with that compound, and considerably less is available for combination with sand, rust, etc., carried in with the metal charge. Consequently, foundries and blast furnaces endeavor to purchase straight limestone or dolomitic limestone with the highest calcium carbonate content. Better grades do not carry over 2 to 4 per cent silica, alumina and iron oxide. The higher those impurities are the more self-fluxing is required, and the less efficient the stone is in obtaining clean iron.

After Relining Cupola Melts Too Fast

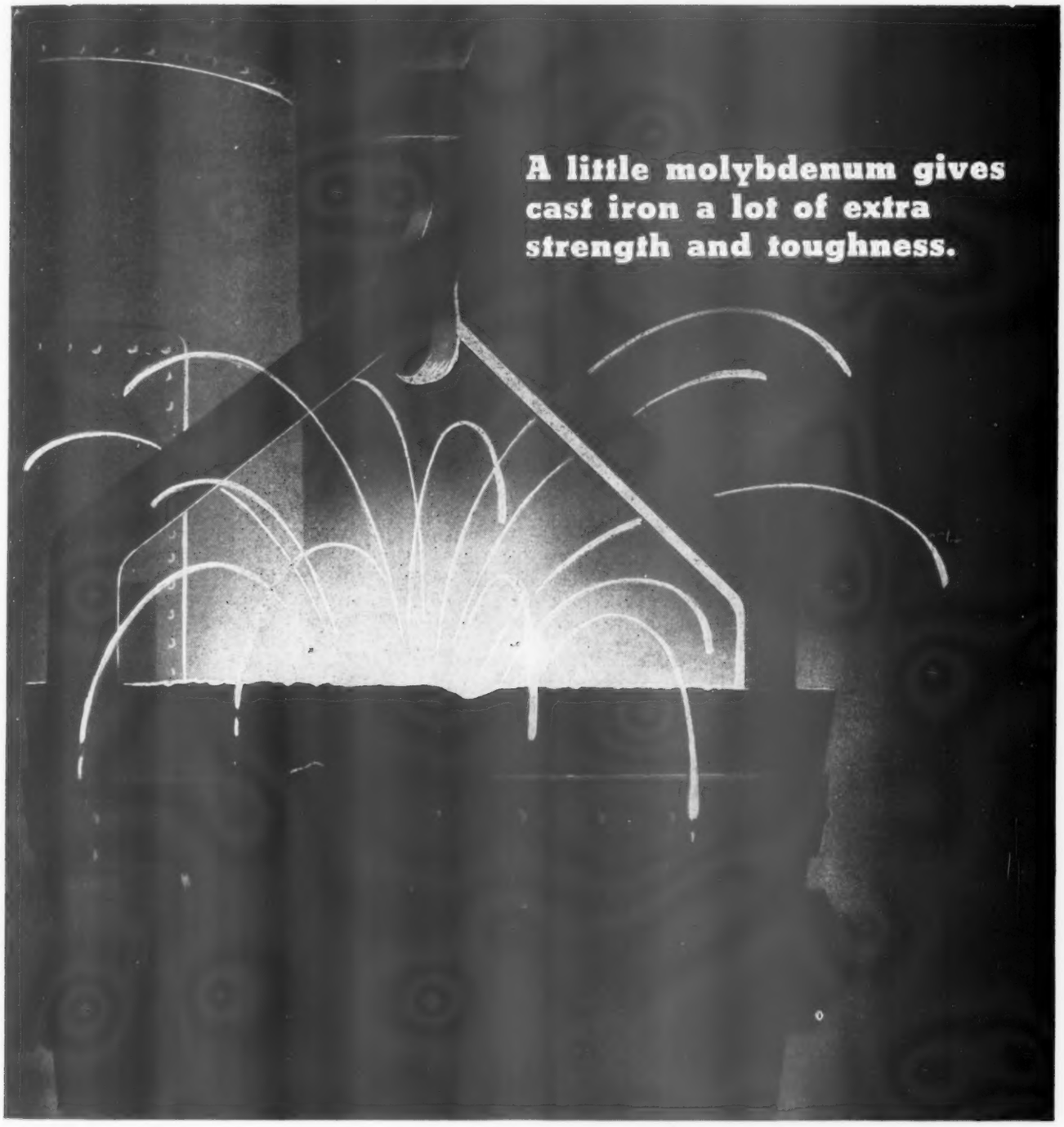
Q.—In starting a new shop we lined down a 64-in. cupola. Using a 42-in. bed with the proper amount of coke between charges we were able to run the iron down successfully with little loss in silicon. However, the iron comes down too fast for our small pouring crew. It has been suggested that we raise the bed and add more coke between charges to slow down melting. What we want to know is what happens if we should do that. It looks to us as though the bed would keep building up.

A.—In our opinion the simplest solution to your problem of iron melting too fast to be handled by the pouring crew is to line the cupola down still further to such a point that the iron can be taken away about as fast as it melts. Procedure would be to determine how much iron can be handled in a given time, say an hour, and then line the cupola to melt at that rate. With blast pressures, quantities and temperatures in common use in cupolas the nominal melting rate per hour is 10 to 11 pounds of iron per square inch of cross sectional area at the melting zone.

The suggested practice of increasing the bed height and the coke between charge to slow down the melting rate is a rather expensive method although it might be used as a temporary expedient. If you do not change the amount of blast to a higher rate, increase of bed height would do nothing but delay the time of melting the first charge, and presumably that is not desired in your case since appearance of the first iron can be adjusted to suit conditions by varying the time of lighting the cupola.

Increase in the size of the coke split between charges will delay melting of the following iron charge by approximately the time required to consume the extra thickness of coke above that actually needed for melting. As you undoubtedly know the melting zone of a cupola occupies a definite position and width when the blast is held constant, and the coke between charges should be sufficient to replace that part of the bed burned away in melting the previous metal charge. Excess coke over that quantity must be consumed, and during that process some of the carbon dioxide generated is reduced to carbon monoxide with a considerable loss in heating value. Hence, the iron melts more slowly.

However, coke costs money and it is decidedly wasteful practice to deliberately use more than is necessary—particularly when the application is such that it is inefficient. You will be much farther ahead to reline the cupola so that the iron is melted at the desired rate.



MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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MOLY

MEN of Industry

M. E. NEVINS

M. E. NEVINS, until recently foundry superintendent at Ampco Metal Inc., Milwaukee, and **Henry Seeboth,** general manager of Milwaukee Bronze Casting Co., that city, have formed a new company to be known as the Whitewater Centrifugal Casting Co., Whitewater, Wis. The new company will specialize in the production of bearings, bushings, valves, etc., in nonferrous alloys, by the centrifugal process. Mr. Nevins, a graduate of the Missouri School of Mines, was associated with the Weirton Steel Co., Weirton, W. Va., before joining the Ampco organization four years ago. Mr. Seeboth will retain his affiliation with the Milwaukee Bronze Casting Co.

♦ ♦ ♦

W. L. BEAUDWAY

W. L. Beaudway, executive vice president, the Chicago Malleable Castings Co., Chicago, has been named president, succeeding **J. T. Llewellyn,** who has been appointed chairman of the board of directors. **L. J. Wise,** assistant to the executive vice president, has been made assistant to the president of the company. **L. F. Hartwig,** works manager, has been made general manager and will be succeeded by **O. P. Fahrenbach,** who has been assistant works manager.

♦ ♦ ♦

Horace A. Deane, works manager of the Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed a vice president of the division, in charge of operations in 18 of the company's plants. Mr. Deane joined the division in 1939 as assistant works manager and since 1943 has been works manager. A graduate of the University of Illinois, he was associated with Deere & Co., Moline, Ill., from 1920 to 1939. Mr. Deane is chairman of the Metropolitan Chapter of the AFA.

♦ ♦ ♦

N. A. Kahn, chief metallurgist of the New York Naval Shipyard, recently was awarded the Meritorious Civilian Service Award by the Navy Department in appreciation of outstanding services and achievements during World War II, specifically his achievements in establishing foundry control procedures, development work which improved foundry yield, and research in radium radiography. Mr. Kahn, a graduate of Lehigh University, was associated with Bethlehem Steel Co. from 1922 to 1926, as research metallurgical engineer. After receiving his master's degree at Washington University, St. Louis, in 1927, he entered the services of the New York Naval Shipyard, the new designation of Navy Yard, N. Y. He is a charter member of Metropolitan Chapter, AFA, and a member of various other technical societies.

♦ ♦ ♦

Lee C. Wilson has established an engineering sales agency to serve the foundry and metalworking industries, and is maintaining headquarters in Reading, Pa., where he has been located for many years. He has been appointed sales agent for Ross-Meehan Foundries, Chattanooga, Tenn., in the Pennsylvania, Maryland and Delaware district. Mr. Wilson is a past president of the American Foundrymen's Association and was formerly vice

(*Continued on page* 122)

HORACE A. DEANE

N. A. KAHN

LEE C. WILSON

Demand for pig iron has now reached one of the highest peaks in the history of the industry.

Our company is putting forth every effort to fill the orders of its good customers as promptly as possible while consistently maintaining the uniform quality for which Woodward iron is known throughout the foundry trade.

We take this opportunity to ask for your continued patience and cooperation during this busy period and your courtesy in acquainting us with your requirement as far in advance as possible.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

GENERAL SALES OFFICES 1515 First National Building • Birmingham, Alabama • Phone 4-6786

(*Continued from page* 120)

president and general manager of the Reading Steel Casting Division, American Chain & Cable Co. Inc., Reading, Pa.

♦ ♦ ♦

John M. Stewart, resident manager of the Pittsburgh office of Hickman, Williams & Co. Inc., has been elected to the company's board of directors. Mr. Stewart has been associated with the company at the Pittsburgh office since 1909.

♦ ♦ ♦

M. E. Erdofy has joined the executive staff of Lithaloys Corp., New York. Widely known as a consulting metallurgical and industrial engineer before the war, Mr. Erdofy served the last four years as colonel with the Corps of Engineers, United States Army. He was operations and reconnaissance officer on construction of the Alaskan military highway, and his regiment also participated in bridge and road construction in France, Belgium and Germany.

♦ ♦ ♦

George E. Miller, formerly vice president in charge of sales and engineering for the Smith Power Transmission Co., Cleveland, has been appointed assistant sales manager of the machine division sales department, Osborn Mfg. Co., Cleveland. Mr. Miller was graduated from Case School of Applied Science.

♦ ♦ ♦

John B. Caine, metallurgist, Sawbrook Steel Castings Co., Lockland, Cincinnati, recently was appointed vice chairman of the Annual Conference Committee, Electric Furnace Steel Committee, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers.

W. S. Mounce, since 1940 senior metallurgist with Hamilton Standard Propellers Division, United Aircraft Corp., East Hartford, Conn., has joined the Development and Research Division of the International Nickel Co. Inc., with headquarters at the New England technical section of the division, Hartford, Conn. Mr. Mounce was graduated from Tufts College in 1939 and attended the Massachusetts Institute of Technology the following year as a special student in the metallurgical department.

♦ ♦ ♦

John L. Moser has been appointed abrasive engineer for the northwestern Pennsylvania and southwestern New York territories of Norton Co., Worcester, Mass., with headquarters in Erie, Pa. Mr. Moser succeeds **R. W. Crawford,** who has become president of the Erie Mfg. & Supply Co.

♦ ♦ ♦

Victor Rowell has been appointed to the technical sales service of the Core Oil Division of Velsicol Corp., Chicago. Mr. Rowell formerly was in charge of tests of foundry sands and components in the metallurgy department of Buick Motor Division, Flint, Mich. He has been active in sand committee work of the American Foundrymen's Association.

♦ ♦ ♦

Victor L. Persbacker has been elected assistant controller of the American Brake Shoe Co., the Canadian Ramapo Iron Works Ltd., and the Dominion Brake Shoe Co. Ltd. Mr. Persbacker joined American Brake Shoe Co. in 1934.

♦ ♦ ♦

Percy Binford, employment manager, American Cast Iron Pipe Co., **Vic Szwed,** industrial relations director, U. S. Pipe & Foundry Co., **E. M. Niblett,** personnel director, Stockham Pipe Fittings Co., and **A. B. Addington,** personnel director, McWane Cast Iron Pipe Co., all of Birmingham, have been elected to the board of governors of the Personnel Officers Association of Alabama.

♦ ♦ ♦

Clyde W. Blakeslee, general manager, N. A. Strand & Co., Chicago, has retired from active management of the company, but continues to be associated with it in an advisory capacity. As general manager, he will be succeeded by **Wilburn H. Swanson,** for the past several years superintendent and general purchasing agent. Mr. Blakeslee has been associated with the company 25 years and actively engaged in the machinery and supply industries for 57 years.

♦ ♦ ♦

Ferdinand G. Schultz has resigned as Pittsburgh district sales manager of American Foundry Equipment Co., Mishawaka, Inc., to devote his entire time to the Ferdinand G. Schultz Co., Pittsburgh, distributor of a general group of foundry and steel plant equipment. The latter company has served the trade for 25 years, is well known in the Pittsburgh tri-state area, and will expand its territory. Mr. Schultz was secretary-treasurer of the Pittsburgh Foundrymen's Association for the past three years.

♦ ♦ ♦

C. Q. Wright has returned to Whiting Corp., Harvey, Ill., as vice president dealing with special staff work. Capt. Wright served as a submarine commander in the recent war. He was graduated from the Naval Academy at Annapolis in 1911 and served in the first World War as commander of a submarine. He resigned his commission to enter business and after holding executive posi-

(*Continued on page* 126)

JOHN M. STEWART

M. E. ERDOFY

GEORGE E. MILLER

JOHN B. CAINE

New ways to save with PHILCO BATTERIES

Now you have palletized unit loads, and the new long-life Philco "Thirty" motive power batteries to make modern electric trucks even more useful and economical. The 30% longer life of Philco "Thirty" means substantial savings in battery replacements. Ask for Philco "Thirty" as initial equipment in your new trucks. Specify Philco "Thirty" on battery replacement orders. Write for specification data today. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.

PHILCO

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

$AVINGS IN TIME

Wheela

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In Nearly

$AVINGS IN POWER

$AVINGS IN MANPOWER

$AVINGS IN MACHININ

$AVINGS IN FLOOR SPACE

American

FOUNDRY EQUIPMENT COMPANY

505 S. BYRKIT STREET — MISHAWAKA, INDIANA

WORLD'S LARGEST BUILDERS F

abrators

by

ORMANCE

3000 Plants

$AVINGS IN COSTS

THE WHEELABRATOR
WHAT IT IS AND WHAT IT WILL DO

This new, informative booklet will give you complete, concise information on all phases of airless blast cleaning. Included in this profusely illustrated booklet are descriptions of the Wheelabrator principle and mechanism; types and sizes of machines available; list of many products now being Wheelabrated; types of Wheelabrated finishes; performance data; and a wealth of additional information. Ask for Booklet No. 74.

2-10 MACHINES

USED BY

322 Plants

10 MACHINES

USED BY

Owens-Illinois Can Co.
Auto Specialties Mfg. Co.
Cleveland Graphite Bronze Co.
Unitcast Corp.
Dayton Mall. Iron Co.
Walworth Company

11 MACHINES

USED BY

American Brake Shoe Co.
Packard Motor Car Co.
Ohio Rubber Co.
U. S. Steel Corp.
A. O. Smith Corp.
Allis-Chalmers Mfg. Co.

12 MACHINES

USED BY

American Radiator and Standard Sanitary Co.
Goodyear Tire & Rubber
Eastern Mall. Iron Corp.
Kelsey-Hayes Wheel Co.
Crucible Steel Co. of America

14-20 MACHINES

USED BY

Bendix Aviation Corp.
Campbell, Wyant & Cannon
Magnus Metal Division
Associated Spring Corp.
Wyman Gordon Co.
Spicer Mfg. Corp.

20-25 MACHINES

USED BY

Thompson Products, Inc.
Borg-Warner Corp.
Firestone Tire and Rubber Co.
Eaton Mfg. Co.
B. F. Goodrich Co.
U. S. Government

25-50 MACHINES

USED BY

International Harvester Co.
General Electric Co.
Timken Roller Bearing Co.
National Mall. & Steel Castings Co.

50-173 MACHINES

USED BY

General Motors Corp.
Chrysler Corp.
Curtiss-Wright Corp.
Ford Motor Company

F AIRLESS BLAST EQUIPMENT

(Continued from page 122)

tions with several national organizations, he joined Whiting in 1939 and was vice president in charge of sales until he left to rejoin the Navy shortly after Pearl Harbor.

♦ ♦ ♦

Alfred H. Hesse, until recently research engineer, Battelle Memorial Institute, with which he had been associated since 1944, has joined R. Lavin & Sons, Chicago. Mr. Hesse will be in charge of the metallurgical laboratory now under construction, to handle foundry research and plant development work. A graduate of Missouri School of Mines and Metallurgy, Mr. Hesse was associated with Western Cartridge Co., East Alton, Ill., for four years. In 1939 he joined the staff of the Naval Research Laboratory, Washington where he organized and headed the nonferrous alloy section of the division of physical metallurgy. He became metallurgist for the Mathieson Alkali Works Inc., Lake Charles, La., in 1943, where he remained until he joined Battelle, a year later.

♦ ♦ ♦

Thomas C. Ford has been appointed district manager of the Pittsburgh office, Electro Metallurgical Sales Corp., a unit of Union Carbide & Carbon Corp. Mr. Ford was graduated from Yale University in 1931 and did postgraduate work in metallurgy at University of Pittsburgh and Carnegie Institute of Technology. From 1932 to 1936 he was associated with the Carnegie Steel Corp., and then joined Electro Metallurgical Co. as a service metallurgist. He has been associated with the company offices in Pittsburgh, Birmingham and Chicago. During the war, Mr. Ford was associated with the chromium, manganese and silicon branch of the Office of Production Management and served as assistant chief and later chief of the ferro-alloys and ores branch of the War Production Board in Washington.

♦ ♦ ♦

Frank A. Mason has been appointed foundry superintendent of the Attwood Brass Works Inc., Grand Rapids, Mich. Recently he had been partner and general manager of the St. Clair Bronze & Aluminum Co., Toledo, O. Mr. Mason has been associated with various nonferrous foundries, having served as superintendent of Aelco Brass Foundry, Milwaukee, superintendent of Dixie Bronze Co. Inc., Birmingham, superintendent of Slack-Horner Brass Mfg. Co., Denver, general superintendent and works manager of Bolen Mfg. Co., Grand Junction, Colo., and general manager of Central Brass Foundry, Toledo, O.

♦ ♦ ♦

Joseph B. Terbell has been appointed executive vice president of the American Manganese Steel Division, American Brake Shoe Co., New York. Mr. Terbell, who has been affiliated with various divisions of the company in sales and executive capacities since 1928, was promoted from a district sales manager's position to a vice presidency with American Manganese Steel in 1940 and three years later was named first vice president.

♦ ♦ ♦

A. W. Sikes has been appointed metallurgical advisor of L. A. Cohn & Bro. Inc., Chicago, smelter and refiner of nonferrous metals and alloys. For nearly the last five years he had served as lieutenant-colonel in the Chemical Warfare Service in this country and abroad. Mr. Sikes was graduated from the University of Illinois in 1926 and received a metallurgical engineering degree from Carnegie Institute of Technology. He was research fellow at the Pittsburgh station of the United States Bureau of Mines in 1927-28, and later was metallurgical engineer for the Western Electric Co. His new duties will include metallurgical investigations, quality control and technical contacts with industry.

♦ ♦ ♦

Leo J. T. Brom has become an active partner in Frank J. Brom Machine & Foundry Co., Winona, Minn., in charge of metallurgical control, research and personnel training. A graduate of the University of Minnesota, he joined the Aluminum Co. of America in Cleveland, in 1942, where he was engaged as control metallurgist in the sand foundry and spent some time in the research laboratories. Mr. Brom is also teaching an industrial extension course in foundry work for apprentices and veterans, sponsored by the Winona High School in cooperation with foundries of that city, during evening classes.

♦ ♦ ♦

Lt. Col. William E. Dierdorf and **Maj. Oscar M. Stanley,** have been added to the staff of E. R. Steinmann & Associates, management and industrial engineers, Brooklyn, N. Y. Colonel Dierdorf was formerly with requirements and stock control division of Headquarters, Army Services Forces, Washington. Major Stanley was connected with the chief of production of the U. S. Engineers Office, Chicago. They have both had extensive foundry experience.

♦ ♦ ♦

Harry A. Blackburn has been appointed refractories engineer for the Pacific coast territory of Norton Co., Worcester, Mass., with headquarters in Los Angeles. Mr. Blackburn has been a refrac-

(Continued on page 128)

ALFRED H. HESSE

THOMAS C. FORD

FRANK A. MASON

JOSEPH B. TERBELL

ENGINEERING HALL, UNIVERSITY OF ILLINOIS

A Leading University

USES BUELL FLY ASH PROTECTION

POWER PLANTS throughout the industries and institutions that serve America recognize the efficiency of Buell (van Tongeren) Collectors as a protection against fly ash dispersion.

Among the various power plants using Buell Fly Ash Collectors is a leading American educational institution, the University of Illinois at Champaign. The plant of the University has used six Buell Collectors with its stoker-fired boiler, for the elimination of fly ash, over a period of several years.

In fact it may be said that power plants employing Buell Collectors represent a fair cross-section of American industry. They include such well known concerns as: BETHLEHEM STEEL COMPANY, STEELTON, PA., PHILADELPHIA NAVY YARD, WESTVACO CHLORINE PRODUCTS CORPORATION, CONNECTICUT LIGHT AND POWER COMPANY, JACOB RUPPERT BREWERY.

Detailed information on Buell Collectors to meet your specific fly ash requirements will be gladly furnished upon request.

BUELL ENGINEERING COMPANY, INC.
14 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

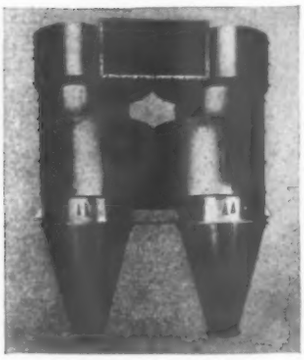


Illustration shows typical unit of a battery of six Buell Fly Ash Collectors installed with stoker fired boiler in power plant of University of Illinois.

CONSULT BUELL *First* IN DUST RECOVERY

FOR CHEMICAL • ROCK PRODUCT • METALLIC • FOOD • FLUE OR ANY OTHER DUSTS

buell
DUST RECOVERY SYSTEMS

(*Continued from page* 126)

tories engineer for the Middle West territory of Norton Co. for over 20 years. **Louis S. Weber Jr.** succeeds Mr. Blackburn in representing the company in Ohio, Michigan and Kentucky and will have headquarters in Dayton, O.

♦ ♦ ♦

Clement J. Freund, dean of the University of Detroit College of Engineering, has been appointed to the Accrediting Committee of the Engineers' Council for Professional Development. He will supervise the examination and inspection operations of technical institutes and engineering schools in Michigan, Ohio, Indiana and Kentucky.

♦ ♦ ♦

Lt. (jg) Edward M. Pinsof, stationed for some time in the Pacific area, has returned to the United States, and upon his release from active duty in the Navy will resume his position as a member of Silverstein & Pinsof Inc., Chicago, with whom he had been associated for ten years prior to his entry into the armed forces.

♦ ♦ ♦

Fred T. H. Youngman, recently executive vice president, has been elected president of the Jessop Steel Co., Washington, Pa., succeeding **R. Edson Emery,** who has been made chairman of the board of directors. Mr. Youngman has been associated with the Jessop Steel Co. for the last 25 years, serving successively as secretary and treasurer, first vice president and executive vice president.

♦ ♦ ♦

James C. Barnaby, consulting engineer of Worthington Pump & Machinery Corp., has been transferred to the general engineering staff at the Harrison, N. J., works, as assistant director of research and development.

♦ ♦ ♦

Earl T. McKinney has joined A. Y. McDonald Mfg. Co., Dubuque, Iowa, in charge of the tool, and wood and metal pattern departments. Mr. McKinney, until recently, was general foreman of the Washington Park Works of the Walworth Co., Boston. Previous connections include Key Co., East St. Louis, Ill., General Steel Castings Corp., Granite City, Ill., and Missouri Pacific Railway, Sedalia, Mo.

♦ ♦ ♦

John B. Anderson has been appointed assistant manager of the central district, Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J., succeeding the late **Stanley J. Waechter.** Mr. Anderson, formerly representative of Manhattan Rubber in southern and western Pennsylvania, will have his headquarters in Pittsburgh. **Joseph Hoffman** has been appointed representative in southern Pennsylvania and northern West Virginia.

♦ ♦ ♦

Amos B. Miner has been appointed manager of industrial sales for National Gypsum Co., Buffalo. Mr. Miner attended Columbia University, and after spending a few years with a manufac-

AMOS B. MINER

turer of industrial machinery he joined Universal Gypsum & Lime Co. in 1932, handling industrial products in the territory west of Pittsburgh. When that company was purchased by National Gypsum Co., he continued in industrial sales with a broader line of products.

♦ ♦ ♦

L. A. Kristoff has been appointed head of permanent mold techniques and production, the John Harsch Bronze Foundry Co., Cleveland, a new department recently established by that company. Mr. Kristoff joined the National Smelting Co., Cleveland, in 1937 as control chemist. Later he became chief chemist for National Bronze & Aluminum Foundry Co., Cleveland, and while there was appointed chief metallurgist of the National Aluminum Cylinder Head Co. When a permanent molding department was opened by Reynolds Metals Co., Springfield, Mass., Mr. Kristoff became plant metallurgist there.

L. A. KRISTOFF

♦ ♦ ♦

Paul G. Jacka has been elected president of Goslin-Birmingham Mfg. Co. Inc., Birmingham, succeeding **George M. Morrow Jr.,** president since 1932, who recently retired. Prior to his association with Goslin-Birmingham Mfg. Co., Mr. Jacka was connected with the Mueller Co., Decatur, Ill.

♦ ♦ ♦

R. J. Kelly, foundry superintendent of the American Skein & Foundry Co., Racine, Wis., for the last 25 years, has resigned to take an extended vacation. Mr. Kelly is a charter member and former director of the Wisconsin Chapter of the American Foundrymen's Association.

♦ ♦ ♦

James R. Allan, first assistant manager, industrial engineering and construction department, International Harvester Co., Chicago, has been appointed manager of the department, succeeding **James D. McGann,** who is relinquishing the post because of ill health.

♦ ♦ ♦

Herbert J. Rosen has been elected executive vice president, Griffin Wheel Co., Chicago. Associated with the company 45 years, he had recently been vice president. **A. J. Soderberg,** formerly auditor and a veteran of 26 years, has been made assistant treasurer.

♦ ♦ ♦

Dr. Raymond G. Spencer, chairman, metals and minerals division, Armour Research Foundation of Illinois Institute of Technology, Chicago, has accepted the directorship of the Washington University Research Foundation, St. Louis.

♦ ♦ ♦

John G. Barta has been appointed manager of the Duluth branch sales office of Allis-Chalmers Mfg. Co., Milwaukee, succeeding William H. Knight, who has resigned. Mr. Barta was formerly in the Milwaukee district office of the company.

♦ ♦ ♦

James S. Duncan, president, Massey-Harris Co. Ltd., Toronto, has been elected a director of the International Nickel Co. of Canada Ltd., to fill a vacancy on the board.

♦ ♦ ♦

David B. Smith, director of the Philco research division since 1941, and an

(*Concluded on page* 130)

MILWAUKEE

Jolt Squeeze Strip Roll-off

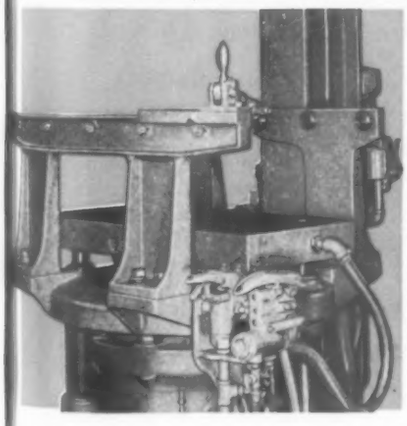
Acclaimed by leading foundrymen for its speed and efficiency, this new machine represents the "last word" in foundry labor-saving equipment. It provides a fast, 5-step cycle of operations and requires only ONE operator. (Actually two men would be in each other's way.) And the operator's ENTIRE efforts are concentrated on mold production. Rails are adjustable for a wide range of flask widths. You'll find this ultra-modern molder equally efficient for short run work or long production runs. Get the complete story today.

Fast 5 Step Operation

1 ROLL-ON
2 JOLT
3 SQUEEZE
4 STRIP
5 ROLL-OFF

Operator easily pulls flask into position on dust-proof roller bearings . . . machine jolts, squeezes and strips . . . operator pushes finished mold to other side . . . ALL without operator moving from in front of machine.

ROLL-OFF POSITION



{ JOLTING POSITION

Made in six sizes... from 12" to 24" squeeze pistons to handle flasks from 12" to 38" in width.

MILWAUKEE Foundry Equipment Co.

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

(*Concluded from page* 128)

authority on radio, radar and television, has been appointed vice president in charge of engineering, Philco Corp., Philadelphia.

♦ ♦ ♦

Dr. Richard J. Lund, recently director of basic research for the Reynolds Metals Co., has joined the staff of Battelle Memorial Institute, Columbus, O. Dr. Lund at one time was director of the Miscellaneous Minerals Division of the War Production Board, Washington.

♦ ♦ ♦

A. Douglas Hannah, formerly chief of the Forgings and Castings Section, Steel Division, War Production Board, Washington, has been elected assistant vice president, Colonial Trust Co., Pittsburgh, in the field of customer relations.

♦ ♦ ♦

Frank H. Janke, assistant to the president of American Brake Shoe Co., New York, has retired from active service with the company. Mr. Janke joined the company when it was founded in 1902 and served as treasurer from 1935 to 1942.

♦ ♦ ♦

Louis W. Kempf, assistant research director for the Aluminum Co. of America, has been elected chairman of the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers.

♦ ♦ ♦

T. E. Eagan, chief metallurgist of the Cooper-Bessemer Corp., with headquarters at the Grove City, Pa., plant, has been appointed chairman of the Gray Iron Division of the American Foundrymen's Association.

♦ ♦ ♦

Dr. John G. Dean has joined the Development and Research Division of the International Nickel Co. Inc., New York, as Senior Fellow-in-Absentia of Mellon Institute of Industrial Research, Pittsburgh.

♦ ♦ ♦

John W. Leslie, president of Signode Steel Strapping Co., Chicago, has been made a member of the board of directors of American Foundry Equipment Co., Mishawaka, Ind.

♦ ♦ ♦

Sigmund Simon, of the accounting department, Superior Foundry Co., Cleveland, was recently awarded a service pin in recognition of 50-years' association with that company.

Steel Founders Pick New Officers

E. D. Flintermann, Michigan Steel Casting Co., Detroit, has been elected president of the Steel Founders' Society of America, succeeding A. M. Andorn, Penn Steel Castings Co., Chester, Pa. Newlin T. Booth, Deemer Steel Casting Co., New Castle, Del., is the new vice president.

Board of directors for the new year comprises: Mr. Flintermann, chairman; Mr. Booth; C. P. Champlin, Strong Steel Foundry Co., Buffalo; Raphael Ross, Dibert, Bancroft & Ross Co. Ltd., New Orleans; J. M. Lloyd, American Steel Foundries, Verona, Pa.; A. A. Stroppel, the Sawbrook Steel Castings Co., Cincinnati; Ross L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich.; Arthur H. Moorhead, the Locomotive Finished Material Co., Atchison, Kans.; C. E. Buckner, Electric Steel Foundry Co., Portland, Oreg.

Col. Merrill G. Baker was reappointed executive vice president, Raymond L. Collier continues as executive secretary, and Charles W. Briggs has been retained as technical and research director. Mr. Champlin was elected a member of the executive committee, to serve with Messrs. Flintermann and Booth.

The society's annual industry meeting will be held Feb. 13-14 at the Edgewater Beach Hotel, Chicago.

Sales Staff Changes Announced

A number of sales territorial changes have been announced by L. L. Andrus, vice president in charge of sales, American Foundry Equipment Co., Mishawaka, Ind.

A. H. Freeman has been appointed sales representative with headquarters in Milwaukee. Mr. Freeman was recently sales engineer in the Detroit office. He has been with the company continuously since 1918 in manufacturing, service and sales positions.

Vernon S. Spears, who had served for several years in the northern Indiana sales territory, has been named sales representative covering practically the entire state of Indiana. He had served in the sales department of the home office for many years prior to his appointment to the sales staff.

Charles E. Ludwig has been named sales representative in a newly-created territory with headquarters in Buffalo. He has been with the company for 11 years, and prior to this appointment was sales representative in the St. Louis territory.

Donald E. Matthews has been appointed sales representative with headquarters in St. Louis. Mr. Matthews was formerly connected with Soreng-Manegold Co., Chicago, as works manager and sales engineer.

Joseph F. Underway, formerly field manager of East Texas Electric Steel Co., Longview, Tex., has been appointed sales representative with headquarters in Houston, Tex. He has been associated with the foundry business for nearly 20 years in various positions.

Robert A. Campbell has been named Canadian sales engineer with headquarters in Toronto, Ont. The past three years he has been associated with Salem Engineering, Canada Ltd., as sales design engineer. Prior to that, he was superintendent of the ammonium nitrate plant, Welland Chemical Works Ltd., Niagara Falls, Canada.

G. R. Bryant, formerly a sales engineer in the Buffalo and New York City sales offices of General Electric Co., has become associated with Robert L. Orth as sales engineer in the Detroit office.

John N. Harper has been appointed sales representative with headquarters in Pittsburgh. Mr. Harper has operated as a manufacturer's agent in Pittsburgh for many years with broad experience in steel products and finishing materials.

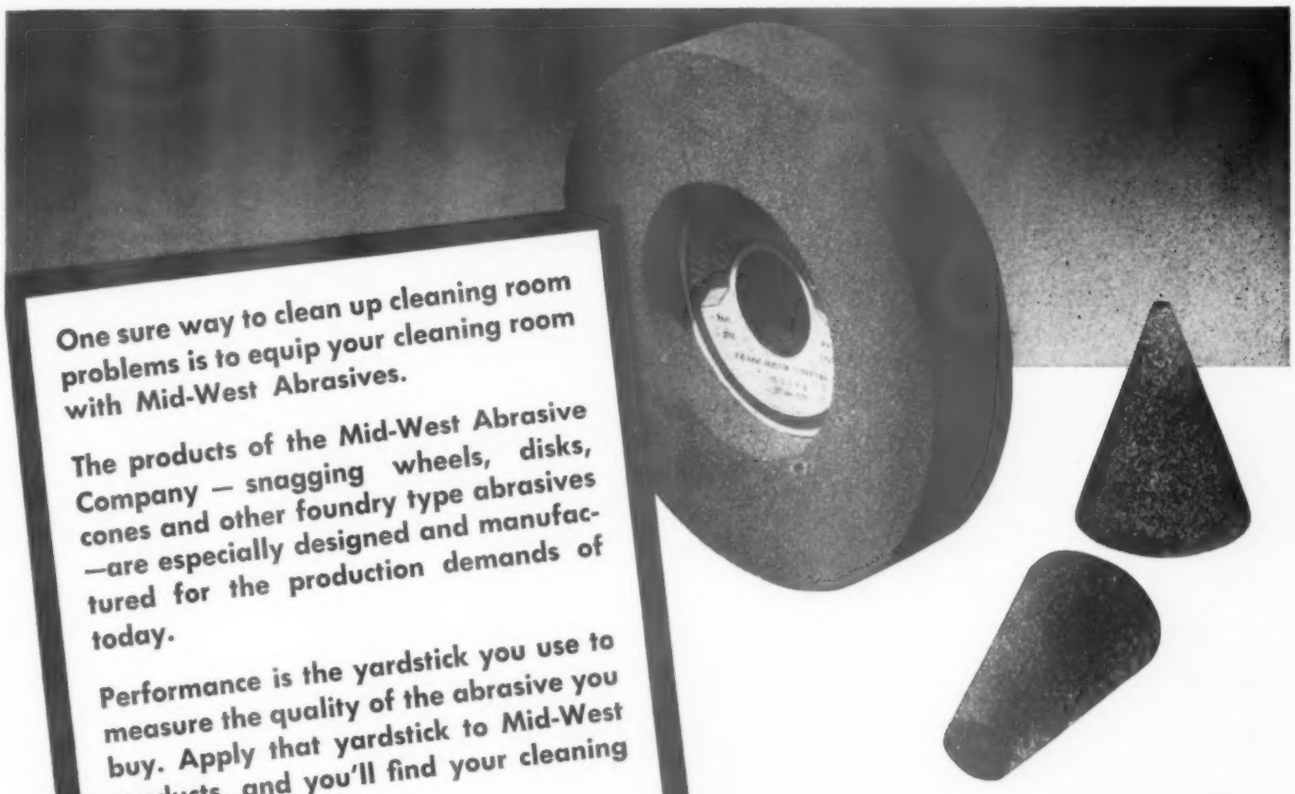
Nonferrous Founders Form Chapter

Following an informal discussion at a meeting last Nov. 5 on possibilities of forming a local chapter, Cleveland district members of the Non-ferrous Founders' Society met at the Cleveland Athletic Club on Jan. 8 and elected the following officers for the ensuing year: President, Ed Frantz, Apex Electrical Mfg. Co.; vice president, William Gluntz, Gluntz Brass & Aluminum Foundry Co., and secretary, E. J. Metzger, Wellman Bronze & Aluminum Co.

Coffee talk at the meeting was given by Judge George Harris on Cleveland municipal improvements. Holley G. Wellman, Wellman Bronze & Aluminum Co., presented an interesting talk on the origin and history of six of the most common nonferrous metals.

Reopen Foundry in Boston School

Wentworth Institute, Boston, reopened the foundry department Feb. 1 after having been closed for the past three and a half years. A considerable amount of new equipment will be installed during the coming year. P. E. Peterson, connected with the institution for many years, will again take up his duties as foundry instructor.



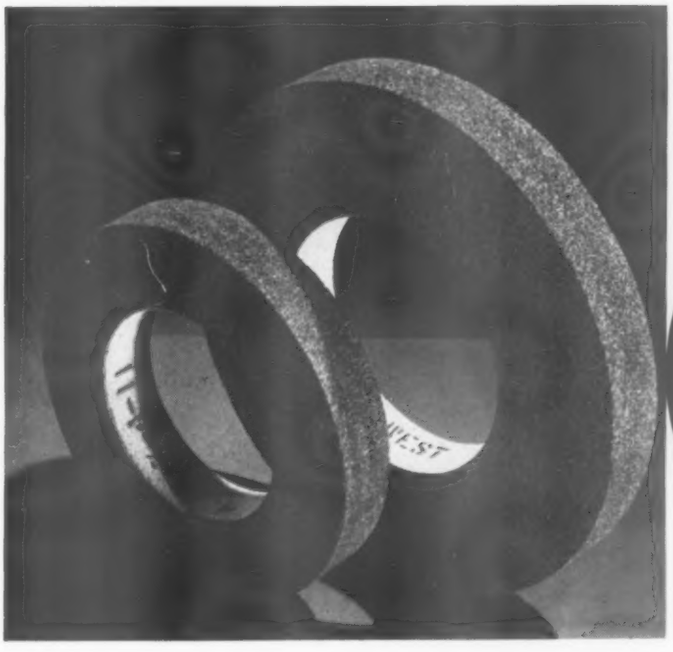
One sure way to clean up cleaning room problems is to equip your cleaning room with Mid-West Abrasives.

The products of the Mid-West Abrasive Company — snagging wheels, disks, cones and other foundry type abrasives —are especially designed and manufactured for the production demands of today.

Performance is the yardstick you use to measure the quality of the abrasive you buy. Apply that yardstick to Mid-West products, and you'll find your cleaning problems solved.

Switch to Mid-West today!

CLEAN UP WITH MID-WEST ABRASIVES



MID-WEST ABRASIVE CO.

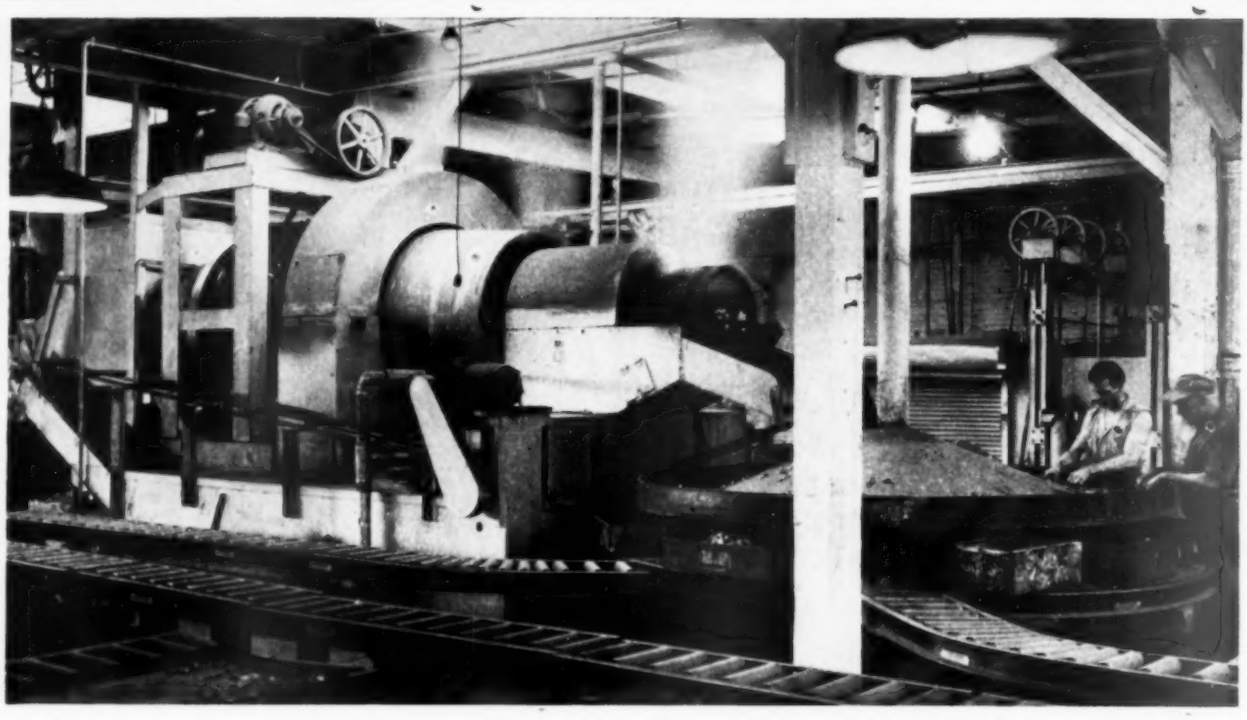
Manufacturers of DEPENDABLE Abrasives

OWOSSO, MICH. • DETROIT

ROCHESTER, PA.

RANSOHOFF *Automatic Star-Return*

WET CLEANING MILLS...



WHAT A MILL! IT REPLACED 24 SMALL MILLS AND SAVED $5,000 YEARLY IN OPERATING COST

So the story goes in practically every installation of RANSOHOFF WET CLEANING MILLS. . . .they save labor, they save operating costs and usually

Modern equipment as designed by RANSOHOFF gives you cleaner castings, faster loading and unloading, better inspection, lower maintenance costs on tool and much, much greater efficiency all around.

SAVE 30% to 70% ON YOUR CLEANING COSTS

speedy . . . . gentle . . . economical . . . not self-destructive . . . . automatic handling of stars

Send us a sample batch. We will run tests and report to you how you save with RANSOHOFF.

MEMBER

MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

N. Ransohoff, Inc.

TOWNSHIP AVE. & BIG 4 RR
CINCINNATI, OHIO

foundry DEVELOPMENTS

INTENSE interest in ways and means to increase yield of castings has led to development of the blind riser with a core, carbon or graphite rod or some other means to admit atmospheric pressure after the skin freezes; to increasing use of the centrifugal process, etc. However the most recent development along that line is reported in our British contemporary, *Foundry Trade Journal*, and describes the use of the usual blind riser into which is inserted a gas-forming material in combination with an exothermic compound. At first only the unprotected gas-forming compound was used, but later it was found that for most effective results that material and the exothermic compound should be protected against reaction until the skin on the blind riser froze to an appreciable amount. Consequently, steel and copper tubes and refractory paint were tried. It is claimed that use of the new procedure gives yields from 80 to 90 per cent in the case of steel castings.

° ° °

TWO new methods for determination of certain elements in metals resulted from work by ASTM Committee E-3 on Methods of Chemical Analysis. One, E 58, gives new standards for checking bismuth in pig lead based on modern technique; the other, E 30, to be a part of the extensively used chemical analysis of steel, covers determination of nitrogen. In connection with photometric methods for bismuth the committee virtually has completed another proposed tentative which would give requirements on apparatus, equipment, etc., used in photometric procedures to which references will be made in the new method E 58. Analytical procedure for nitrogen resulted from extensive co-operative research in the committee whereby the proposed test was compared by several members with different procedures in use, including in some cases their own modifications. As a result of work on 11 steels and alloys containing 0.234 to 0.0046 per cent nitrogen, new methods were demonstrated to be satisfactory.

° ° °

NEWEST procedure for descaling metals is the sodium hydride process developed by E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. Scale on the metal is reduced by sodium hydride dissolved in fused caustic soda, and blasted from the surface by generation of steam in a subsequent water quench. A few seconds' dip in acid to brighten the surface completes the operation. The bath is said to be effective on alloy and stainless steels, and on nickel, cobalt and copper. Sodium hydride is generated in the fused caustic bath by admission of hydrogen obtained by dissociating ammonia gas. Advantages cited for the process include shorter descaling time, uniform descaling, no loss of metal, no pitting of work, no electric current, comparatively low operating temperature, etc.

° ° °

DIVISION of Trade Standards, National Bureau of Standards, Washington 25, is circulating to producers, distributors, testing laboratories and users of cast aluminum cooking utensils, "Recommended Commercial Standard for Cast Aluminum Cooking Utensils (Metal Composition) TS-4021" for written acceptance. Submitted by the Cast Division Aluminum Wares Association, the proposed standard states that the permissible alloying elements of cast aluminum cooking utensils shall be limited to silicon, magnesium, zinc, titanium, chromium and manganese, which may be employed in any amounts suitable to the respective alloy. Chemical composition with respect to other elements shall be limited to 0.3 per cent maximum Cu; 0.1 per cent maximum Ni; 1.0 per cent maximum Fe; 0.05 per cent maximum each other element, and 0.15 per cent maximum total other elements.

° ° °

WITH so much attention being given to the atomic bomb, which under the proper condition results in the creation of a vast quantity of energy from a comparatively small amount of matter, it might be pertinent to recall that the reverse of that process—the creation of matter from energy—also can be accomplished. However, since a small amount of matter corresponds to an enormous energy, only minute amounts of matter can be secured even with expenditure of huge quantities of energy. This creation or formation of matter from energy is accomplished with radiation from the General Electric Co. new atom smasher, a device called the betatron which operates at 100,000,000 volts, and is called "pair formation." The amount of matter formed in the process is extremely small and only visible in a "cloud chamber" which is part of the apparatus, being indicated by a v-shape track of fog.

E. B.

INTERESTING process pioneered by the Superior Bearing Bronze Co., Brooklyn, N. Y., during the war which augurs possibilities for postwar products is the heat treatment of magnesium castings in gas-fired ovens without a controlled SO_2 atmosphere. This firm made magnesium castings for aeroplane parts and also vital parts for jet propelled planes. They covered a wide range of sizes, from 10 oz to 150 lb. Each part was heat treated in a standard gas-fired industrial oven at temperatures of 730 F to 760 F depending on the particular alloy of the casting. Ten thousand castings a day were heat treated in these gas-fired ovens without a single reject due to the heat treating process. Superior Bearing Bronze Co.'s process of heat treating magnesium castings in ordinary gas-fired ovens, without any hazard, and without any thought as to atmosphere, it is claimed will speed production by simplifying the operation and a consequent reduction in processing costs.

Around DETROIT

BY A. H. ALLEN
Detroit Editor, The Foundry

Increasingly short supplies of pig iron, coke and scrap add further complications to foundry outlook. . . .Cast scrap expected to continue scarce for many months

AS IF the throttling effect of strikes and a wage-price impasse rapidly growing catastrophic were not enough, foundrymen are now being confronted with increasingly short supplies of basic materials—pig iron, coke and scrap—which are coming dangerously close to forcing suspension of operations at some plants. Vendors of these basic ingredients for gray iron foundries stoutly maintain the situation still is "nip and tuck" but that they have averted any shutdowns and hope to continue on the safe side of the ragged edge.

Tightness in pig iron springs primarily from the recent coal strike, estimated to have cost merchant iron producers the equivalent of six-weeks' production from blast furnaces. On top of this the shortage of ferrous scrap in foundry grades has forced melters to make adjustments in their charges tending to increase the proportion of pig iron. However, most foundries have been able to get by, some switching mixtures slightly to make use of grades of iron not ordinarily specified, some by using silvery iron with briquets, some by praying hard that a carload on order would arrive in time.

Fuel Stocks at Low Level

One merchant furnace interest in this area reports coal inventories currently are running about eight-days' supply, against a normal eight-weeks' tonnage. The coal situation should get no worse, but by the same token it is going to be difficult to build up stocks to any extent. The threatened national steel strike would have a further disruptive effect on pig iron supplies that would have immediate repercussions on foundries. As the situation stood a few weeks ago, most foundries were being covered on iron requirements, although part of the credit had to be given to the strike in General Motors plants which had tied up operations in Buick, Pontiac, Cadillac and Chevrolet gray iron foundries since November.

Inventories of pig iron at foundry plants, normally kept at around a 30-day supply, are well below this point, particularly among smaller operators where a two-weeks' backlog is more nearly the average. There are isolated exceptions, such as the plant near Detroit which insisted on shipment of a car of pig iron by Dec. 15. The supplier was barely able to make the deadline, only to discover production will not be started until Feb. 1 at the earliest.

The outlook for cast scrap is very black. Supply is at the lowest ebb in many years, practically none is coming out, and scrap interests say the supply in the field is so scant that not even a price inducement would drive out any appreciable quantity. Chief sources for cast scrap are old motor blocks, machinery, agricultural equipment and railroad items. The proportion of cast material in machinery scrap has been declining in recent years, while scrapping of motor blocks has been well below the normal rate since suspension of automobile production in 1942. Normally there is a fairly large supply of so-called "country scrap" which can be enticed to market by the proper price, but the numerous scrap drives held during the war years fairly well cleaned up stocks of such material and there has not been time for further supplies to accumulate. Railroad and agricultural scrap does not usually move to the market in this area, and likely would be snapped up by melters closer to the point of origin long before it could get to the Detroit area.

Instances are reported of foundry purchasing agents going to scour the territory for scrap, apparently unconvinced by reports from brokers as to the scarcity of cast grades. They have returned convinced.

What the answer will be no one ventures to say now. It will be many months before scrapped motor blocks begin to appear in the processing cycle again, and while there should be a fairly plentiful supply of production steel scrap from motor plants within 30 days after full-steam operations are achieved this does not hold out any promise for cast grades.

Some operators are wondering whether it may be in order to consider importing these short grades of scrap from European battlefields. Certainly there are many thousands of tons scattered over Europe in the form of damaged structures, equipment and battle implements. UNRRA officials might give thought to putting some of the idle peoples of Europe to work collecting such scrap which could be sold to melters in this country, thereby establishing some small measure of credit for the collectors to purchase food and clothing. Probably such an idea would be rejected at once, since it would involve no appropriation or loan of cash by the U. S.

On the score of coke, the picture likewise is none too encouraging, although Michigan foundries as yet have not run into actual shortages. Here again the General Motors strike has been helpful to suppliers, some of whom confess they do not know what they would do for coke should the four GM foundries resume momentarily. Contributing to the tightness in coke is a shortage of open-top railroad box cars fitted with special containers for easy handling of the fuel. Users willing to accept coke in gondolas ordinarily can get better service.

Step Up Material Orders

Meanwhile many foundries are pushing up their schedules and ordering larger tonnages of all basic materials. Kelsey-Hayes Wheel Co. foundry, for example, currently is taking about four cars of coke per month, but expects to move rapidly to a point where eight to ten cars a week will be needed.

• • •

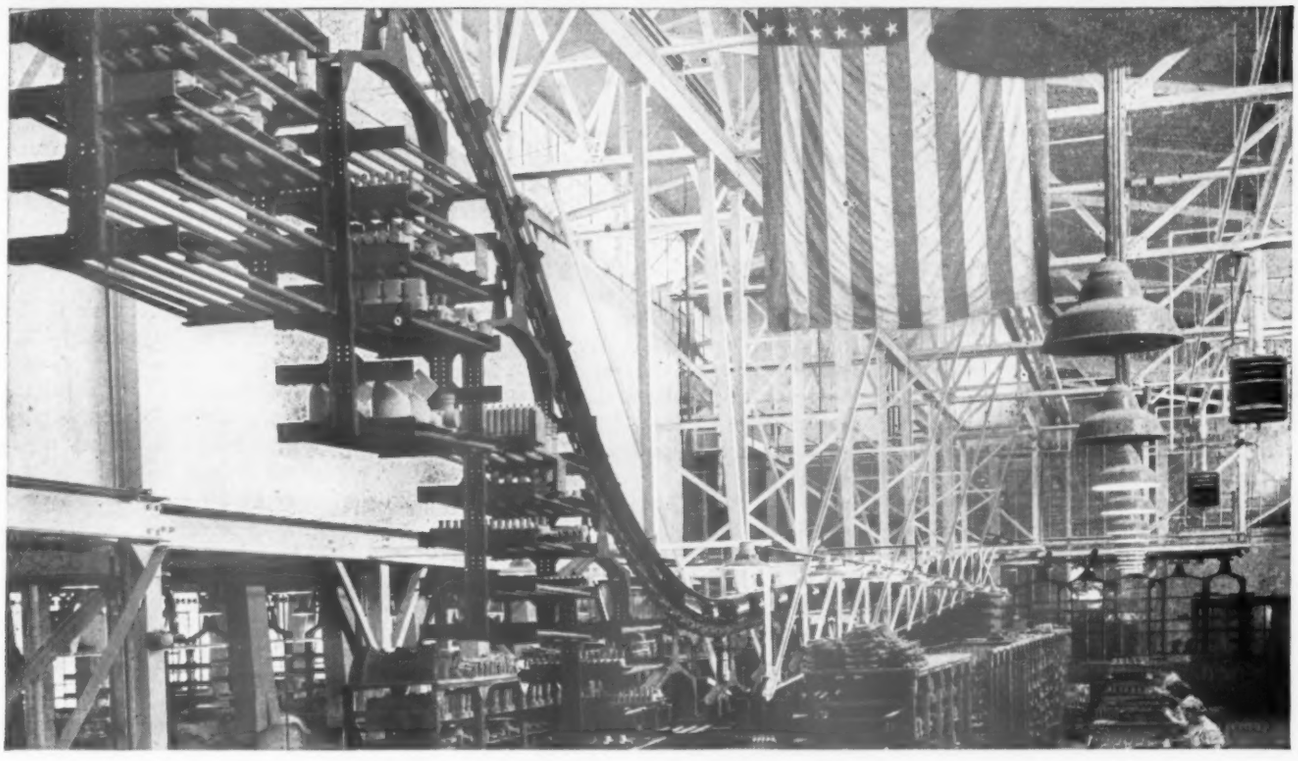
THIS department normally does not run very strong on fan mail, but in recent weeks two communications have been received from an anonymous correspondent which may bear comment, despite the fact such diatribes customarily are not even given routine reading. In this case, an exception is in order because the letters reflect so typically the confusion and ignorance in the minds of many average workmen in the foundry field, and they reveal so plainly the virus of class hatred planted there by loquacious union leaders. Also evident is the implicit trust placed in every newspaper item read by some working people. Our correspondent, who signs himself simply

(*Concluded on page* 136)

Mathews

TROLLEY CONVEYERS

Engineered to serve Production



Trolley Conveyers are being applied in modern foundries for handling materials, usually cores and castings, through Production Departments, from one building to another, and in many other ways are operating to serve production. Transverse bends lower the loads to working height, keeping a continuous flow of materials reaching the working area. The conveyers do their work without occupying valuable floor and aisle space. They can serve one or several floor levels, and can be applied inside or outside the buildings. Variable speed drives make possible the exact control of the material reaching the working areas and the many types of hangers available add to the flexibility of the conveyers. Mathews Trolley Conveyers, like other prominent Mathews types for foundry application, are on the job today in many of the nation's great foundries. A Mathews Engineer operates in your vicinity, and would appreciate an opportunity to help you with that conveying problem.

Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA

(*Concluded from page* 134)

"Disgusted," sends along a sheaf of clippings to prove his case. In his first letter, Mr. D. lashes out as follows:

"The writer has just read your disgusting and untrue articles in THE FOUNDRY, where you write about the unemployed enjoying their $21 per week benefits, yet in the next issue write about a Michigan foundry employing only 650, whereas their wartime peak was 5000 and prewar 3000. Their unwillingness to add more men to their payroll is a literal sort of restraint of trade and should be punished . . . a department of justice investigation. . . . An ex-war plant worker who saved the stockholders $200,000 per year with suggestions for improving methods is unemployed today because his war plant is closed indefinitely. Why? (Signed) Disgusted."

Within two weeks came a follow-up:

"Why print nonsense about labor shortages, when there are thousands of skilled unemployed workers and war veterans looking for jobs?

"What is needed is more new products and inventions, new enterprises like Kaiser-Frazer Corp., Jack & Heintz Inc. and Lincoln Electric Co.

"In ....., we find the ..... Corp. had shut down its plant, not even making an attempt to modernize it for profitable operation. There is another foundry owner who cares more for the welfare of his horses in ..... than for his workers.

"Is it any wonder that such men as Frankensteen and Reuther become radicals and union leaders. Two weeks ago I was in Detroit and talked to a man who worked with Reuther at Ford. If Reuther had been given a supervisory job at that time he would not have become a union leader.

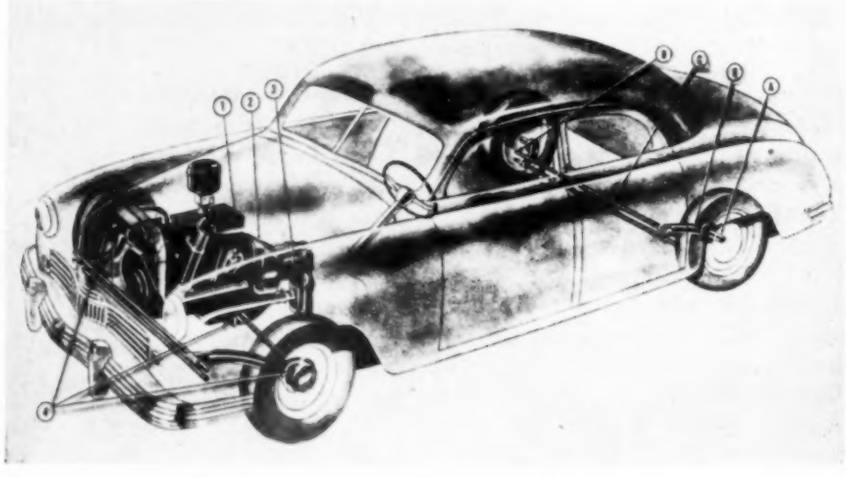
"If I had my way I would fire the whole management of General Motors and install Walter Reuther as president. He is managing the strike better than GM. It is time GM got some new blood in the organization.

"So in the future print something worthwhile about the new products like the Kaiser-Frazer motor made by Continental, the die cast air-cooled aluminum Jack & Heintz engine, the Crosley-Taylor welded engine, the Reo Motors lawnmower, the Eaton Mfg. Co. rotor pump, the Ford foundry program (*see January issue—Ed.*) etc. Make your articles worth reading. Thank you."

Well, friend Disgusted, we try to do the best we can, but you just can't satisfy everybody. This department primarily is concerned with activities in foundries around Detroit and we are not on the Jack & Heintz mailing list anyway, so perhaps you can find Jahco material elsewhere. As far as Mr. Reuther and his efforts to upset time-tested wage-price policies of both industry and labor unions are concerned, we are afraid he will not make it, but suggest that you watch the papers for details. Mr. Reuther usually sees that his ideas are there even before the people he is talking to get a chance to hear them.

As for the Continental engine to be used in the Frazer car, we understand it is a conventional 6-cylinder in-line job, remarkably resembling the Ford 6-cylinder engine. It will be built in Detroit and shipped to the Kaiser-Frazer Willow Run plant for installation in the new cars which they say will be coming from assembly lines around March 15. A somewhat similar but lighter engine will be used in the Kaiser car, to appear later in the year, and reports have it that eventually K-F will switch from the Continental to an entirely different type of engine.

The principal trouble with these light die-cast engines and brazed steel engines like those of Jahco and Crosley-Taylor is that they are noisy and clanky, tending to shake themselves loose at the seams. There is nothing like a solid chunk of gray cast iron in an automobile engine to dampen out those vibrations and noise.



UNDER THE KAISER HOOD: This phantom view of the new Kaiser car shows its so-called "packaged power" front-wheel drive, consisting of engine (1)—a Continental, 6-cyl, 75-hp unit; clutch (2); transmission (3), and final drive assembly (4). Suspension system provides independent springing for each wheel through spindle (A), supporting arm (B), and torsion-bar spring (C) anchored at (D)

* * *

NEW gray iron foundry for production of lighter types of castings is being built at Kingsford, Mich., in the Upper Peninsula near Iron Mountain, for the Lake Shore Engineering Co. of Iron Mountain and Grede Foundries Inc., Milwaukee. It will be a combined foundry and machine shop, initial structure covering only part of a proposed long-range expansion program. Lake Shore Engineering now operates a foundry at Marquette, Mich., on Lake Superior, but offices are at Iron Mountain.

The new foundry and machine shop will be located on a 26-acre site and will comprise 50,400 sq ft of floor space. Equipment will include two cupolas, sand conditioning system, covered scrap yard, mold conveyors and cooling tunnels, along with extensive employe facilities. Castings will be the smaller automotive type, with production of 25 tons daily slated to start by mid-1947.

Architects for the project are Giffels & Vallet & L. Rosetti, Detroit, which organization also is currently laying out four foundry projects for construction in South America and one in China.

Reports also are heard of a new foundry project at Cheboygan, Mich., to be operated by the Cheboygan Foundry & Mfg. Co.

Although it is no longer strictly news, it may be of interest to many to learn that 87 per cent of the outstanding capital stock of Monroe Steel Castings Co., Monroe, Mich., has been acquired by Miller Mfg. Co., Detroit maker of automotive service tools. Deal involved cash with proceeds from a $1 million bank loan. Thus far, no changes have been reported in the management at Monroe.

New Representatives

Newly appointed sales representatives of the Forker Corp., Cleveland, manufacturer of hoists, are Samuel G. Boyd, Atlanta; Ohio Mechanical Handling Co., Akron; Robert Abel Inc., Boston; and A. C. Towne & Son, Buffalo.

GUARANTEED
TO OUT-WEAR
☆
OUT-LAST
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ANY SHOVEL MADE
Unconditionally
With Blades of
SUPER-TOUGH . . .
LONGER WEARING
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STEEL
Moly
REG. U.S. PAT. OFF.
Moly Shovels, spades and scoops are made in all required types, styles, sizes and weights.
A Plus-Premium Quality Product of
THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO
A national organization specializing exclusively in Shovels, Spades and Scoops
Moly
REG. U.S. PAT. OFF
MO-LYB-DEN-UM
ALLOY
SHOVELS

Wartime Expansion in Light-Metal Foundries

DETAILED data relative to the government's approximately $100 million wartime investment in aluminum and magnesium foundries and production capacities of these plants are included in two reports presented to Congress recently by the Surplus Property Administration. Similar information concerning wartime expansion of ferrous foundries was published in THE FOUNDRY for August, 1945, p. 128.

One of the SPA reports shows that the government invested nearly three-quarters of a billion dollars in the aluminum industry as a whole, including facilities for production of alumina and primary aluminum, and for fabrication of such products as castings, forgings, sheets, bars, etc. Principal investment was in reduction plants ($215 million). Foundries and foundry equipment that were financed cost $72,337,000, compared with other types of fabricating plants as follows: Sheet, strip and plate $112 million; forgings $85 million, and extrusions $102 million.

Cylinder Heads Take Most

Money spent on different types of aluminum foundries was divided as follows:

Sand (excluding cylinder heads)	$18,804,000
Permanent mold	3,399,000
Cylinder heads	50,134,000

Part of this money was spent for plants and facilities wholly owned by the Defense Plant Corp., the remainder representing DPC-financed equipment installed in privately-owned plants. The investment for individual plants, and their rated capacity as of 1944, are shown in Table I. This investment, in the case of privately-owned plants, represents disbursements less sales, transfers, etc., as of last April 30, and for DPC plants as of last May 31.

Total annual capacity of the aluminum sand casting plants, excluding cylinder head foundries, is given in the report as 279,936,000 lb. Only a little over 10 per cent of this total consists of DPC plants.

While the government, through the DPC, spent almost $370 million for plant to produce magnesium metal, the second report indicates, the investment in plants and equipment to convert this metal into commercially useful forms, such as castings, extrusions and forgings, was only slightly over $31 million as of the end of July, 1945. About two-thirds of this was invested in 11 government-owned fabricating plants, the remainder in equipment located in 14 privately-owned plants.

As contrasted with aluminum, in which the government spent upon fabricating facilities 54 per cent of the total expenditures for all aluminum facilities, the investment in magnesium fabricating plants constituted less than 8 per cent of total government expenditures for that metal.

There are no very accurate data on the percentage of United States magnesium fabricating capacity which is govern-

(*Concluded on page* 141)

TABLE I—Aluminum Foundry Capacity and Government Investment

Owner, Operator and Location	Annual Capacity as of 1944 (1000 lb)	Government Investment ($1000)
SAND CASTINGS		
Grand total	**279,936**	**$18,804**
DPC plants	28,800	4,575
Delco-Remy Div., General Motors Corp., Bedford, Ind.	15,600	3,000
National Bronze & Aluminum Foundry Co., Cleveland	13,200	1,575
Privately-owned plants (total)	251,136	14,229
With DPC equipment	70,428	14,229
Acme Aluminum Alloys Inc., Dayton, O.	9,600	91
Aluminum Alloys Corp., Detroit	4,500	*
Aluminum Industries Inc., Cincinnati	4,800	*
Bohn Aluminum & Brass Corp., Detroit	10,800	*
Elmira Foundry Co. Inc., Elmira, N. Y.	1,764	521
Ford Motor Co., Dearborn, Mich.	9,000	1,612
Werra Aluminum Div., General Malleable Corp., Waukesha, Wis.	4,164	216
Buick Motor Div., General Motors Corp., Flint, Mich.	3,600	8,952
Howard Foundry Co., Chicago	3,600	*
Maytag Co., Newton, Iowa	6,000	*
Metal Parts Corp., Racine, Wis.	600	*
National Foundry Co. Inc., St. Louis	600	*
Oberdorfer Foundries Inc., Syracuse, N. Y.	3,600	*
Packard Motor Car Co., Detroit	7,800	2,837
With no government financing	180,708	.....
Aluminum Co. of America:	28,980	.....
Cleveland	10,200	.....
Fairfield, Conn.	6,600	.....
Detroit	8,400	.....
New Kensington, Pa.	180	.....
Vernon, Calif.	3,600	.....
All other plants	151,728	.....
PERMANENT MOLD CASTINGS		
Grand Total	151,800	$3,399
DPC plants	6,000	3,015
Reynolds Metals Co., Springfield, Mass.	6,000	3,015
Privately owned plants (total)	145,800	384
With DPC equipment	13,200	384
Kinney Aluminum Co., Los Angeles	1,800	165
Monarch Aluminum Mfg. Co., Cleveland	4,200	179
Permold Co., Medina, O.	7,200	40
With no government financing	132,600	.....
Aluminum Co. of America	25,560	.....
Cleveland	19,200	.....
Detroit	2,400	.....
Fairfield, Conn.	2,580	.....
New Kensington, Pa.	180	.....
Vernon, Calif.	1,200	.....
All other plants	107,040	.....
DIE CASTINGS		
Privately owned plants	127,944	.....
Aluminum Co. of America, Garwood, N. J.	14,820	.....
All other plants	113,124	.....
CAST CYLINDER HEAD PLANTS		
Grand total	278,656	$50,134
DPC plants	193,404	41,069
Aluminum Co. of America, Kansas City, Mo.	36,000	5,855
Chrysler-Dodge, Chicago	36,000	7,478
Ford Motor Co., Dearborn, Mich.	26,004	7,850
Buick Motors Division, Flint, Mich.	45,000	9,083
National Aluminum Cylinder Head Co., Cleveland	14,400	4,387
Wright Aeronautical Corp., Lockland, O.	36,000	6,416
Privately owned plants (total)	85,252	9,065
With DPC equipment	29,100	9,065
Caterpillar Tractor Co., Peoria, Ill.	6,700	450
Nash-Kelvinator Corp., Kenosha, Wis.	7,900	908
Oberdorfer Foundries Inc., Syracuse, N. Y.	1,900	117
Servel Inc., Evansville, Ind.	3,400	118
Wright Aeronautical Corp., Woodbridge, N. J.	9,200	7,472
With no government financing	56,152	.....
Aluminum Co. of America, Detroit	8,000	.....
Aluminum Co. of America, Bridgeport, Conn.	30,500	.....
All other plants	17,652	.....

*Investment included in $2,837,000 for Packard Motor Car Co.

Setting Records

C-120 GRADE
CROWN HILL
100 LBS.
100 LBS.
SEACOAL FACING
"CROWN HILL MEANS QUALITY SEACOAL"
MANUFACTURED ONLY BY
THE FEDERAL FOUNDRY SUPPLY CO
CLEVELAND, OHIO
CROWN HILL, W. VA. - CHICAGO - DETROIT - MILWAUKEE
NEW YORK - RICHMOND, VA. - MINNEAPOLIS - UPTON, WYO.
CHATTANOOGA, TENN. - ST. LOUIS, MO.

CROWN HILL SEACOAL FACING is a superior product whose high quality, quick-flash properties have resulted in new production records at a reduced cost in many foundries throughout the country. CROWN HILL is quick venting and extremely low in sulphur. The insignificant ash residue won't fuse under 2,780° F. which means easy peeling . . . lower cleaning costs.

Cutting Costs

THE FEDERAL FOUNDRY SUPPLY COMPANY

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Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WYO.

IN TWIN CITIES: The Foundry Supply Co., Inc., 2295 University Ave., St. Paul 4, Minn. IN SOUTHWEST: Beaumont Cement Sales Co., Houston & Beaumont, Texas, and Harvey, La.

TRIED AND PROVEN

WEIGHT
60 LBS.

GLOBE SILVERY IRON

RECENT SURVEY REVEALS 97% FAVOR

THE GLOBE PIG

Which offers these advantages to users–

UNIFORM THICKNESS—*Means uniform melting*
DENSE—*Free from kish*
LARGE MELTING SURFACE—*Means uniform melting*
LIGHT—*Easily handled–Easily racked*
DISTINCTIVE—*Easily identified*

YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING OF GLOBE

GLOBE IRON CO.

SINCE 1872 **JACKSON, OHIO**

(*Concluded from page* 139)

ment-owned. Excluding capacity arising from government equipment in "scrambled" facilities, the Reconstruction Finance Corp. estimates that the government owns the following proportions of capacity:

	Per Cent
Sand casting	37
Die casting	20
Permanent mold casting	1
Sheet	0
Extrusions	42
Forgings	50

After allowance for capacity arising from government equipment in private plants, and recognizing that many private plants, especially foundries, will convert to other metals, such as gray iron and aluminum, it is believed that the government's stake in the fabricating field is much larger than shown.

Casting facilities represented a large proportion—almost 90 per cent—of the total investment in magnesium fabricating plants. This compares with less than 25 per cent for the foundry share in the case of aluminum fabrication. Government-owned magnesium foundries and DPC-financed equipment in privately-owned plants represent a total investment of $26,869,369, broken down as follows:

Sand	$26,144,678
Permanent mold	198,980
Die castings	525,711

These sums were apportioned among individual plants as shown in Tables II and III.

Abrasive Co. Makes Change in Name

Change in the name of Abrasive Co., Philadelphia, a division of Simonds Saw & Steel Co., Fitchburg, Mass., to Simonds Abrasive Co., has been announced. In 1927 the company was purchased by Simonds Saw & Steel Co., manufacturers of saws, files, machine knives and steel specialties. A new Simonds master trademark will be officially adopted. There is no change in ownership, management or policy.

New Steel Foundry Is Organized

Chester Electric Steel Co., a new company headed by Fred Grotts as president, has been established to acquire the Crum Lynne, Pa., foundry of the Atlantic Steel Casting Co., Chester, Pa. This plant was built during the war with government funds and operated by the Atlantic company. The new company, now in full operation, will specialize in carbon, alloy and stainless steel castings.

FRED GROTTS

Other officers of the company are: Vice president and treasurer, Stanley J. Roush; plant manager, William Burroughs; sales manager, Sam Nicholson.

Mr. Grotts, since 1939 president of Fort Pitt Steel Casting Co., McKeesport, Pa., formerly was vice president of Lebanon Steel Foundry, Lebanon, Pa., and previously was metallurgical director of the various divisions of Continental Foundry & Machine Co.

Tonawanda Revises Sales Arrangement

Tonawanda Iron Corp., North Tonawanda, N. Y., which for the past 11 years has been represented in the East by Rogers Brown-Lavino Co., now is being represented there by Louis H. Miller, New York, and Charles A. Reed, Boston, as individuals. Both were formerly branch managers of the latter company. Tonawanda pig iron sales in the Pennsylvania territory will be handled directly from the furnace at North Tonawanda. Rogers-Brown-Lavino Co. has discontinued its Boston and New York offices and is carrying on its activities through the main office, 1528 Walnut St., Philadelphia.

Fuller Co., Catasauqua, Pa., has moved its Chicago district office from its former location to 120 South La Salle St. C. C. Kaesemeyer is the manager in charge.

TABLE II—Government-Owned Magnesium Casting Plants

Lessee and Location	Annual Capacity (Short tons)	DPC Disbursements to Aug. 1, 1945
SAND CASTINGS		
Bendix Aviation, Teterboro and North Bergen, N. J.	1,800	$1,217,633
Chrysler-Dodge, Chicago	9,000	7,000,000
Dow Chemical Co., Bay City, Mich.	800	1,762,137
Howard Foundry Co., Chicago	3,600	2,577,598
Maryland Sanitary Mfg. Co., Baltimore	3,000	2,127,859
Wellman Bronze & Aluminum Co., Cleveland	1,500	702,896
*Wright Aeronautical Corp., Lockland, O.	4,500	5,000,000
Total	24,200	$20,388,123
PERMANENT MOLD CASTINGS		
Metal Mold Magnesium Corp., Cedarburg, Wis.	1,100	198,980
DIE CASTINGS		
Precision Castings Co., Fayettevilie, N. Y.	1,200	381,413
Grand Total	**26,500**	**$20,968,516**

*Wright Aeronautical Corp.'s Paterson, N. J., plant includes both aluminum and magnesium facilities and data not available for magnesium break-down.

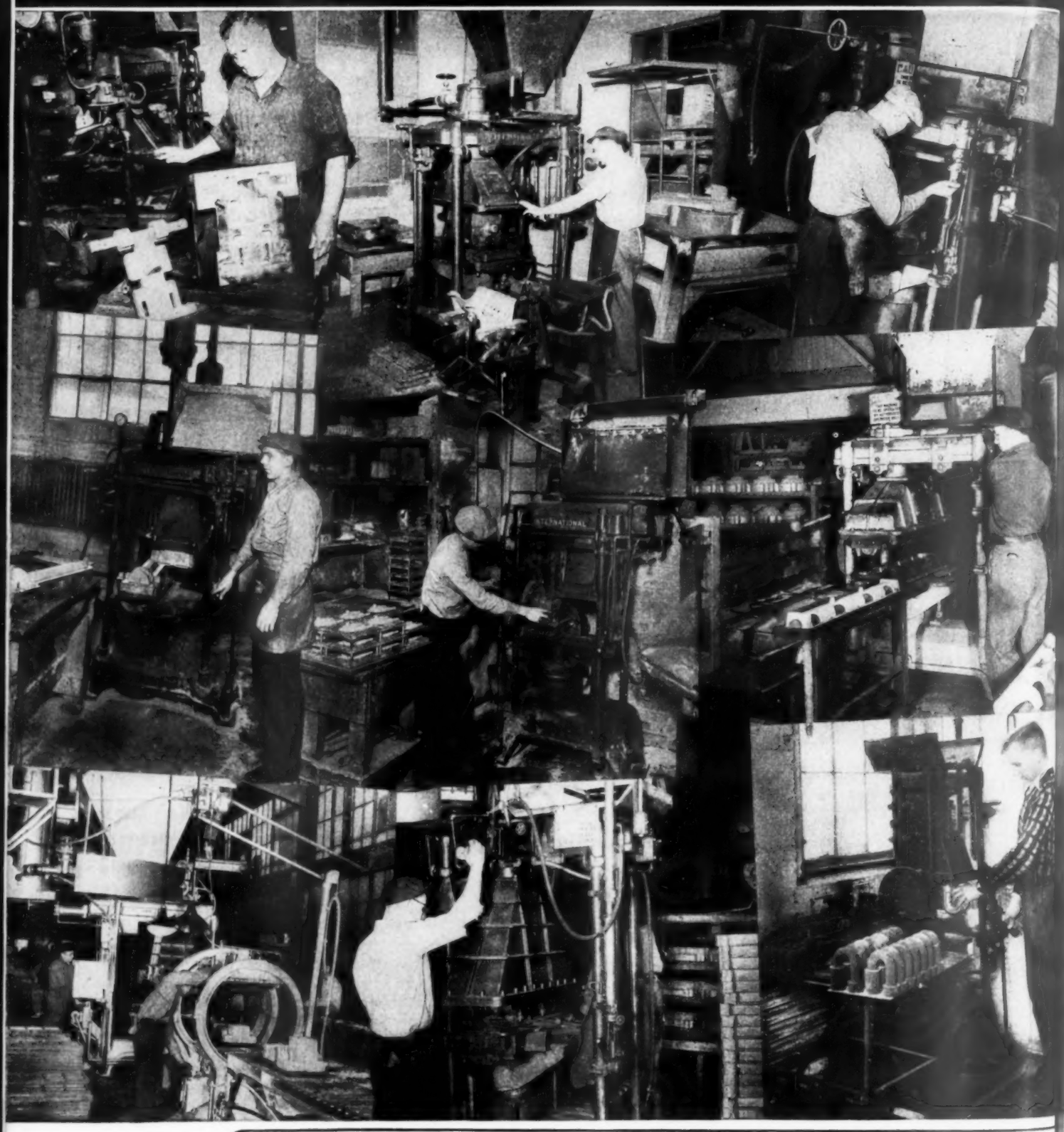
TABLE III—DPC Equipment Installed in Lessee's Magnesium Plants

TABLE III—DPC Magnesium Equipment Installed in Lessee's Plants

Lessee and Location	DPC Disbursements to Aug. 1, 1945
SAND CASTING FOUNDRIES	
American Radiator & Standard Sanitary Corp., Louisville	$633,472
American Radiator & Standard Sanitary Corp., Elyria, O.	629,147
American Radiator & Standard Sanitary Corp., Litchfield, Ill.	599,369
Ebaloy Foundries Inc., Rockford, Ill.	149,496
General Motors—Chevrolet, Saginaw, Mich.	632,280
Hills-McCanna Co., Chicago	226,486
Humphreys Mfg. Co., Mansfield, O.	528,974
Marshall Stove Co., Lewisburg, Tenn.	344,428
Michigan Light Alloys Corp., Grand Rapids, Mich.	1,222,973
Renown Stove Co., Owosso, Mich.	33,070
United States Radiator Corp., Geneva, N. Y.	756,860
Total	$5,756,555
DIE CASTINGS	
Hoover Co., North Canton, O.	144,298
Grand Total	**$5,900,853**

Note: Total does not include disbursements for equipment to the following plants since they are no longer magnesium fabricators and equipment has been transferred out, sold, or diverted to other forms of production: Capital Foundry Co., Brooklyn, N. Y., $18,109; Deere & Co., E. Moline, Ill., $290,315; Springfield Bronze & Aluminum Co., Springfield, Mass., $2,960,175.

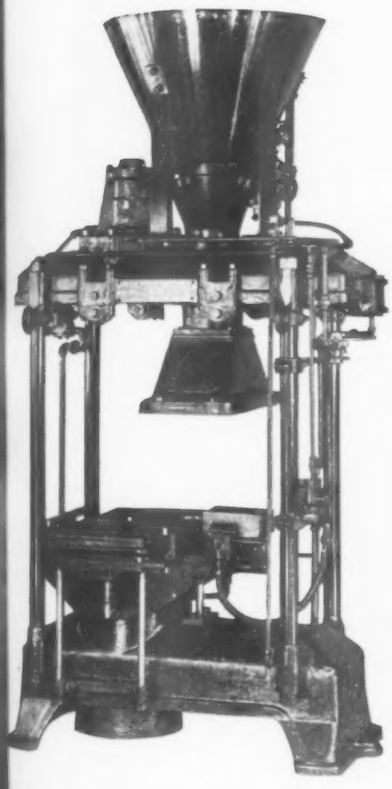
Sand Blowers b



INTERNATIONAL MOLDING

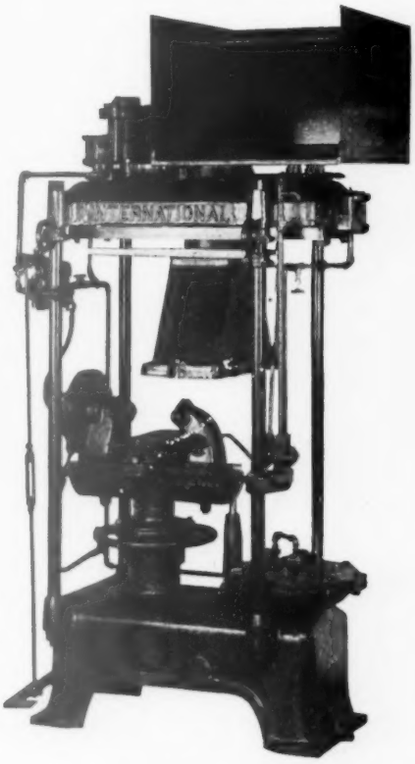
2608 WEST SIXTEENT

INTERNATIONAL



Type SB 13 — Sand Blower, adapted especially for horizontally split boxes of medium size, but larger than can be handled by the SB 11 machine. May be had with the roll-out feature for ease in handling large core boxes. (Side clamps and vibratorially agitated hopper available as extra features.)

Type SB 11 — For medium sized cores with air clamp and draw feature. (Side clamps, rollers, vibratorially agitated hopper are all available as extra features.



Type SB 10—Sand Blower, adapted especially for medium size split boxes. Side clamps are standard equipment. (Vibratorially agitated hopper is available as an extra feature.)

A COMPLETE LINE OF SAND BLOWERS

The possibilities in the use of INTERNATIONAL SAND BLOWERS in the Core Room and Foundry are very extensive and with the proper pattern set-up and the International "know-how" many industry problems become greatly simplified.

WRITE FOR ILLUSTRATED BROCHURE ON INTERNATIONAL SAND BLOWERS

MACHINE COMPANY

TREET, ★ CHICAGO 8, ILL.

READERS' COMMENT • • •

Why Help Is Scarce

To The Editors:

The December number has just been received and reviewed.

Usually the review is followed by reading, either forwards or backwards, "The Adventures of Bill", then, in due time the foundry practice features would be studied. However, in this number, the first article read is found on page 142 with an illustration of the author. Therefore, I am tempted to remark that this article contains the fundamental reason for the scarcity of help in metal founding.

I have inspected foundries from coast to coast, and have found that foundries are the most messy of all manufacturing plants. Of course, there are some foundries that are as clean and orderly as a well-managed office.

We receive many inquiries from the producers of castings, and the problems that interest them most relate to the securing of suitable equipment and materials, and the methods that will overcome losses. Castings are not made in dirt, and men, women and apprentices do not flock to the industries where dirt in the plants predominates.

F. W. Brady
Director
School of Shop Practice,
International Correspondence Schools
Scranton 9, Pa.

View Incorrectly Stated

To The Editors:

In your interesting article on the Chicago meeting of the Gray Iron Founders' Society in The Foundry, I note the following regarding a paper that the writer presented:

"One of the nation's difficulties is that it has accumulated too much overhead in relation to its capacity for producing wealth."

To express my views, this should have read "too much overhead in relation to the wealth that is being produced."

The tremendous overhead (meaning that part of our national income which is not engaged in the creation of wealth) which this country is carrying has retarded the consumer power, and if we had an efficient national economic policy, we could consume many, many more units of wealth than ever before known, and we most certainly would be able to produce them. Our capacity to produce wealth is practically unlimited.

The subject of our economic policy is of great importance to me, because I believe if there is no improvement we cannot carry on much longer as a nation of free people, and every right-thinking American does have an obligation to our future Americans in that we should prepare the way for them rather than to have a greedy desire of fictitious (debt) prosperity.

We, of this generation, will not be able to pay the interest on our national debt without going deeper into debt by doing so, let alone reduce the principal.

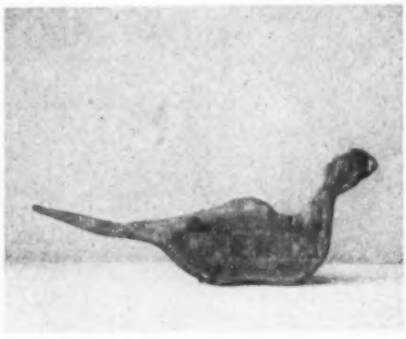
A sound economic policy can correct these dangers.

H. C. Nicholas
Manager
The Quality Castings Co.
Orrville, O.

Oshkosh "Pheasant"

To The Editors:

We are enclosing evidence that it is not necessary to go to South Dakota for pheasant hunting. The one pictured was



"caught" in our shop. The phenomenon resulted through accidental spillage from a bull ladle, and was called to our attention by the operator.

George A. Zabel
Assistant Superintendent
Universal Foundry Co.
Oshkosh, Wis.

Foundry Opportunities

To The Editors:

The article, "Some Bottlenecks of Reconversion," by Hon. Alexander Wiley, U. S. Senator from Wisconsin, which appeared in the December issue of The Foundry, was excellent. But how will we entice 70,000 workers into the industry, when in advertising for workers in the foundry, the qualifications are pictured as individuals of huge size, (Samsons) with bulging muscles. Illustrations show workers clad only in trousers with no covering above waist, and working in dark and smoky atmosphere. The average pay is given as $1.02 per hour. Department of Labor has recently announced, "If you do not make at least $1.05 per hour, you will have a rough time breaking even on living costs."

There is a great future in the foundry industry. Foundrymen should tell the prospective employee of the many advancements to be had. They should sell the foundry to the young men, for it can be done. Let us all work for a better industry.

Ben J. Rejona
336 Kendalia Ave.
San Antonio 4, Texas

This Is Liberty

To The Editors:

Your *Man To Man* articles by Ralph Lee in The Foundry each month are rather unusual in that they throw a ray of light in some of the dark corners of shop operation—corners usually avoided by professional and amateur wielders of the duster, broom and mop pail. Seems to me it is about time some person flashed a light into the pattern shop.

Through many years of training and experience I am a highly skilled wood and metal patternmaker, at present working in a job shop. For obvious reasons I do not specify location. The point is immaterial since the same conditions prevail throughout the industry. When I work overtime alone on a job I have a general argument next day with members of the shop crew. In one recent instance I finished a job in 150 hours. An exact duplicate, except that one was right and one was left, made by another man on straight time, required 250 hours. I got general hell all around and was advised to slow down. I was solemnly, profanely and angrily warned that I was killing the trade.

Consider the subject of core driers or shells. When a master pattern is right the drier fits the core and no further work is needed on it. That is the way I was taught to make driers by a master patternmaker in Detroit. Here I got a bawling out that shouldn't happen to a dog for making driers that fit. No work needed except to drill pin holes in 100 driers so they can be delivered to the customer in a hurry. The owner of the shop was not sore. All the squawking came from the employees.

I never have seen but two shops simi-

(*Concluded on page* 146)

Alcoa Aluminum, Pig and Ingot ...

BETTER TO START WITH . . . BETTER AT FINAL INSPECTION

- Alcoa Aluminum pig and ingot are uniform, sound, and free of inclusions—the result of 58 years of manufacturing experience.

When you charge your melting pots with aluminum pig or ingot bearing the Alcoa trademark, you are assured that this batch will behave exactly like the previous one.

Alcoa offers you, in addition, the consulting services of highly skilled aluminum technicians to help you with your metallurgical problems.

See our nearest sales office or write
ALUMINUM COMPANY OF AMERICA,
1823 Gulf Bldg., Pittsburgh
19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

MAN-TO-MAN on the Molder's Bench

"Spade Callers"

By RALPH L. LEE

I HAVE never become well acquainted with any foundry gang in which I did not find at least one of those plain-spoken salts-of-the-earth who prided himself on calling a spade a spade, and I can't remember a single one of these spade-callers who was not having a lot of trouble with people who had it in for him. Most of us will agree life is far too short to fool around with those who play the truth like an accordion or are afraid to handle it at all. But on the other hand, I think none of us cares much for folks who seem to get a bang out of going around digging sensitive people with jagged little slivers of the truth. Somewhere in between insincere hooey and crude ill-mannered bluntness seems to be the right spot for getting along with those we've got to deal with on the job.

Some time ago, a foundryman friend of mine, obviously down in the dumps, invited me into his little cubbyhole office to talk shop. He started off by telling me that, as he knew I already knew, he was a man of a few words—called a spade a spade—and felt that he had a right to, for everyone knew his work spoke for itself. He went on to say that while the big shots of his outfit recognized the importance of his work, for some reason or other, the small fry he was forced to deal with wouldn't listen to him, seemed to have it in for him and did their damnedest to spike him at every turn. He couldn't understand why the brass hats on top didn't put a stop to these pewee saboteurs on the bottom.

I agreed with him that work as important as he said his was should not be interfered with, but after learning that the sole purpose of his work and the only reason for his job was to help the very people who seemed to have it in for him, I couldn't for the life of me see how orders from the top could solve his problems. I, of course, didn't come right out and bluntly tell him so, for I knew that plain-spoken people are usually

too proud to have their own personal spades called spades.

Instead, I told him that according to what I read in Benjamin Franklin's autobiography, he and Ben had much in common. For Ben seemed to have the same kind of trouble with people he was having. I told him how a Quaker friend of Ben's asked him one day whether he knew he was considered to be pretty proud and not satisfied with being right but downright insolent about it at times. Ben didn't believe it at first but the Quaker friend gave him positive instances to prove it. Ben finally got hep to himself and went so far as to absolutely forbid himself ever using any word or expression that indicated a closed mind and a fixed opinion such as *certainly, undoubtedly, positively*. But instead, he used *I comprehend, I imagine* a thing to be so and so, *it so appears* to me at present.

Ben went on to say that when another asserted something he thought was wrong, he denied himself the pleasure of contradicting him abruptly in what he had to say. Instead, he began by saying that, in certain cases or circumstances, he could see how the other fellow could be right but in the present case there appeared or seemed to be some difference.

Ben soon found that conversations went on more pleasantly, his opinions were more frequently accepted and his face didn't get nearly so red when he turned out to be wrong. In fact, Ben was convinced that his weight with his fellow citizens, when he proposed new institutions or changes in the old, was largely due to the humility habit he had gotten into after one whale of a struggle with himself, although he said he had to fight against being too proud of his humility.

I don't know whether my spade-calling friend profited from what I told him of Ben Franklin's experience. I suppose he, like I am sometimes, is so proud that he can't resist the temptation to cover up his own defects by pointing out the other fellow's. But be that as it may, I do know from my own experience that my spells of spade calling are always followed by a marked increase in the number of people who seem to have it in for me, and whenever that number increases to a point where it becomes my most serious problem, I know for a fact that I am slipping badly and blaming the slippage on those who can't do much about it and wouldn't if they could.

So I have concluded that if those I have got to get along with object to my calling their spade a spade, I will call it anything they choose as long as they know what I am talking about and as long as the spading goes ahead on schedule.

(*Concluded from page* 144)

lar to the one described by Mr. Lee. The owner in one just gave a man a drawing marked for finish and shrink allowance and how the job was to be molded. Then the man was on his own. He did a day's work and was paid well, up to $175 a week with overtime and no questions or arguments raised. A man who could not produce was out on the sidewalk in a hurry. That is where the expression *sidewalk patternmakers* came from in Detroit.

A PATTERNMAKER

New Representative

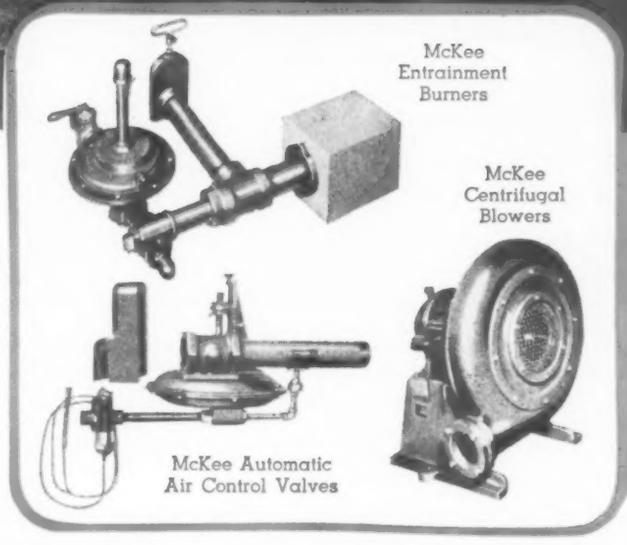
Hyde Abrasive Products Co., 83 Fairfield Ave., Bridgeport, Conn., has been appointed representative in the New England states for the Safety Grinding Wheel & Machine Co., Springfield, O.

Again, McKee Eclipse

COMBUSTION EQUIPMENT

DEMONSTRATES ITS

Superior Combustion Control



Send for descriptive bulletin on the particular equipment in which you are interested.

65 FURNACES IN MIDDLE WEST FOUNDRY ARE PRODUCING ALUMINUM CASTINGS

Free of Pin Hole Porosity

Pictured here are only 15 of about 65 McKee equipped furnaces, engaged in melting Aluminum and Magnesium for Aircraft Parts—a type of casting that must pass the most critical inspection. To help prevent any inferior castings, these furnaces use McKee-Eclipse Combustion Equipment for complete and automatic control of combustion conditions:

McKee Entrainment Burners that accurately maintain a constant air-gas ratio over an extremely wide turn-down range—McKee Automatic Air Control Valves, recommended wherever a smooth, gradual-acting hi-low air control is desired—and McKee Centrifugal Blowers assuring minimum vibration and constant air pressure. McKee Engineers will be glad to work with you on your Combustion Equipment problems. Write Eclipse

McKee Eclipse

ECLIPSE FUEL ENGINEERING COMPANY

Gas Combustion Equipment, Industrial Gas Furnaces, Steam Boilers and Dowtherm Generators, Centrifugal Blowers and Heat Treating Containers.

If it's for Gas—buy Eclipse

725 South Main Street
Rockford, Illinois.

SANITARY WARE FOUNDRY Modernized

RICHMOND Radiator Co., Uniontown, Pa., recently placed in operation at Monaca, Pa., a modernized plant for production of sanitary ware. This plant, after being idle for about a year, was acquired by the Richmond company early in 1943 from the U. S. Sanitary Mfg. Co. and since that time has been completely revamped and rehabilitated. The accompanying illustrations show scenes the first day operations were resumed.

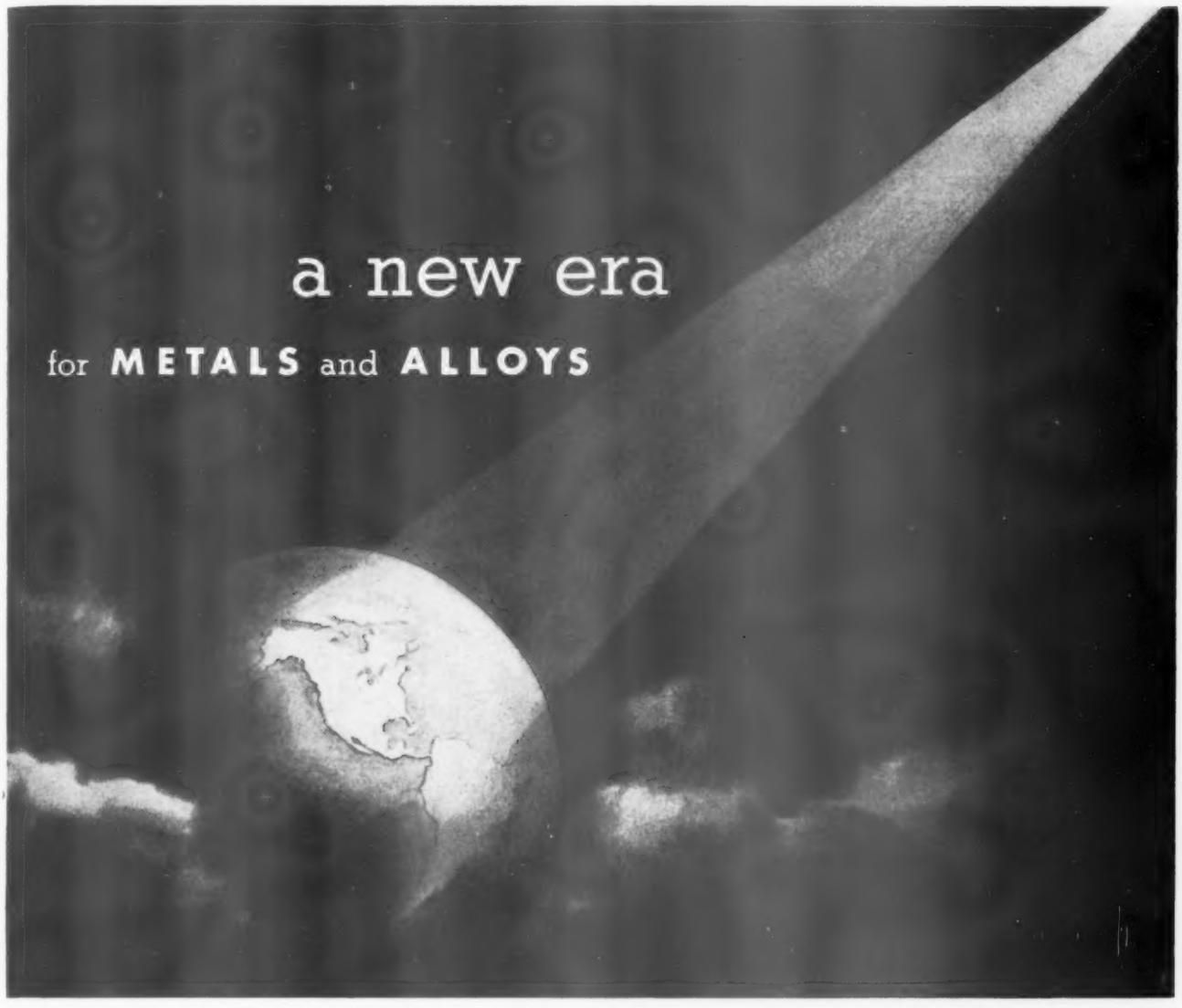
Modern facilities are employed throughout the plant. Melting units, consisting of three 78-in. cupolas, are mechanically charged and are tapped into mixing ladles, with molds poured from a monorail conveyor. Molds are rammed by four sandslingers, each of which is served by a complete mechanical sand system, including shakeouts, pouring rails, storage hoppers, etc. One of the slingers is arranged over a large turntable; after ramming, the molds are conveyed to the pouring station by roller conveyors, and empty flasks from the shakeout are returned to the molding station by another conveyor.

Castings are cleaned by an automatic blasting unit using a mixture of crushed steel and shot. The unit has a capacity of 80 hangers per hour and each hanger can carry up to six castings of the same types of lavatories and sinks. Swing type and flexible shaft grinders are used in the cleaning department.

The company manufactures all of the enamel required. Equipment in the smelting department includes three 3000-lb batch type smelters fired by luminous flame burners using natural gas. Frit is dried by a direct-fired automatically-controlled gas unit. The milling department has one 6-ft continuous grinding mill, one 7-ft continuous mill and eight batch type mills of various sizes.

Ten modern box type furnaces are employed in the enameling department. The ware is handled in and out of the furnaces by jib cranes, and the enameling is done on air-controlled mechanical enameling tables.

Fig. 1—H. L. Charlton, president, Richmond Radiator Co., starts blower for first heat at revamped Monaca, Pa., plant. Fig. 2—William Probst, Monaca plant manaer. Fig. 3—L. C. Thunfors (left), vice president in charge of manufacture, and Mr. Charlton tapping the first iron. Fig. 4—Left to right: F. B. Mahoney, general plants manager; R. T. Patterson, chief engineer, and Mr. Thunfors



Alloys were never so important as in the period now brought to a close, all due weight being given to the usefulness of complementary materials.

Acute shortage of steel-alloying elements occurred; but facing every such emergency the modern metallurgist found an answer for the need, and by so doing speeded victory.

Now, with the new year, a new era begins. During the war, everything was expendable but knowledge. That remains. Knowledge developed for war, shows the way to better peacetime uses. More and more applications will be found for the stronger, tougher, more lasting materials that have been made available; and the rate of progress, greatly quickened as it has been by urgent need, will carry on into an era of better living.

Larger use of alloying materials in the production of iron and steel, yielding more economical and more beneficial results, will be one of the principal factors in this advance.

The Molybdenum Corporation, as a large supplier of Molybdenum, Tungsten, and Boron, issues informative literature and is glad to be consulted by any user of these products.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
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MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

It's Not Impossible

—The Highest Quality At the Lowest Cost!

LECO COMBUSTION BOATS

Compare any combustion boats with the Leco Line.
Will other boats fill the following Leco specifications?

1. **Fast pre-heating because of light weight.**
2. **Withstand temperatures up to 2700° F.**
3. **Resist heat shock to permit re-use of the boat for repeated combustions.**
4. **Low carbon blank.**
5. **Sulphur free.**
6. **Will not burn through at elevated temperatures.**
7. **Lowest cost on the market.**

The style No. 6 boat is 3-3/8" long, 1/2" wide, and 13/32" high. This boat is an all purpose boat designed for combustion work up to 2700 degrees Fahrenheit. It is especially well adapted for use in combustion sulphur determinations. The penetration of the burning sample into the boat is practically negligible. The material will stand reheating without cracking, thus the boat can be reused until it is completely filled with oxide residue. This boat is remarkably free of carbon and sulphur blank. Price: $35.00 per thousand.

The style No. 6B is same as above except it is sulphur free. The style No. 6 shield is made from similar material, is quite thin and light in weight. This shield will withstand reheating and may, therefore, be used many times. Price: $27.00 per thousand.

The style No. 5 combustion boat is 3-1/2" long, 3/4" wide, and 7/16" high. Constructed of materials which will resist extremely high temperatures, it will withstand the fluxing action of the burning metal. The No. 5 boat will withstand reheating without cracking, thus the boat can be reused without bedding until it is completely filled with residue, or when used with a bedding material it will last for many determinations. Instances have been reported where this boat has been used 140 times.
Price: $100.00 per thousand.

The style No. 2 combustion boat is somewhat smaller than the style No. 6 boat. It is 3-3/8" long, 1/2" wide, and 1/4" high. Constructed of dense material this combustion boat can be used in high temperatures with small penetration. This boat is extremely light in weight and attains combustion furnace temperatures within a very short time, thus materially decreasing the preheating period. This boat is designed as a single determination boat.

Price $35.00 per thousand.

The style No. 2 shield is similar to the No. 6 shield.

Price $27.00 per thousand.

The style No. 7 boat is 4-3/4" long, 3/4" wide, and 7/16" high. It is constructed from the same material as the No. 5, but has both ends square and has no ear.

Price $15.00 per hundred.

The style No. 5 boat and the style No. 7 boat have been designed for use in gravimetric carbon analyses, where it is desired to use a large size sample and/or a bedding material, and a large diameter combustion tube.

LABORATORY EQUIPMENT CORPORATION

BENTON HARBOR, MICHIGAN

A GLOSSARY OF TERMS EMPLOYED IN THE FOUNDRY

(Continued from January issue)

CORE GRINDER—Machine for grinding a taper on the end of a cylindrical core or to grind a core to a specified dimension, usually flat face.

CORE GUM—A pitchy material used as a core binder.

CORE KNOCKOUT MACHINE—A mechanical apparatus for removing cores from castings.

CORE MACHINE—Machine for making cores.

COREMAKER—A person who makes cores.

CORE OIL—Linseed-base or other oil used as a core binder.

CORE OVEN—An oven for baking cores.

CORE PASTE—Material in paste form used as an ahesive to join sectional cores.

CORE PLATE—A plate or board made of metal or heat resisting material on which certain types of cores are baked.

CORE PRINT—An extension of the pattern for locating the core or an extension of the mold cavity for locating the core.

CORE ROD—Iron or steel in rod form used to stiffen or support a core internally.

CORE ROD STRAIGHTENER—Machine which is used to straighten core rods after use.

CORE ROD CUTTER—A device on which core rods are cut to desired length.

CORE ROOM—That part of the foundry in which cores are made.

CORE SAND—Sand for making cores.

CORE SAND MIXER—Equipment in which core sand is mixed.

CORE SETTER—An operator who places cores in molds.

CORE SPINDLE—A shaft on which a core barrel is rotated in making cylindrical cores.

CORE SPRAYER—A device for spraying a coating on cores.

CORE STRICKLE OR TEMPLET—Device of wood or metal to give shape to certain types of cores or molds.

CORE TRUCK—Truck or carriage used for transporting cores.

CORE VENTS—A wax product round or oval in form used to form the vent passage in a core. Also refers to a metal screen or slotted piece used to form the vent passage in the corebox employed in a core blowing machine.

CORE WASH—Refractory coating for a core.

CRAB—See arbor.

CRACK, COLD—Appears in a casting after solidification and cooling due to excessive strain generally resulting from nonuniform cooling.

CRACK, HOT—Developed in a casting before it has cooled completely, and usually due to some part of the mold restraining solid contraction of the metal.

CRANE—A machine for lifting heavy weights; may be hand or power operated. Types include electric, gantry, gib, monorail, etc.

This is the third installment of an extensive glossary of foundry terms compiled by Edwin Bremer from a wide variety of sources. In the development of this material a great amount of help has been secured from the *Steel Castings Handbook* published by the Steel Founders' Society of America, Cleveland; *American Malleable Iron* published by the Malleable Founders' Society, Cleveland, and from unpublished work of a Committee on Foundry Nomenclature of the American Foundrymen's Association, Chicago. THE FOUNDRY wishes to thank all sources from which this material has been obtained

THE EDITORS

CREEP—Time rate of deformation continuing under stress intensities well within the yield point, proportional limit or the apparent elastic limit for the temperature.

CRITICAL POINTS (TEMPERATURES)—Temperatures at which changes in the phase of a metal take place, and are determined by liberation of heat when the metal is cooled and by the absorption of heat when the metal is heated, resulting in halts or arrests on cooling and heating curves.

CROSS—Device used for lifting and binding large loam molds.

CRUCIBLE—A ceramic pot or receptacle of graphite-clay, clay or other refractory material in which metal is melted. Term sometimes is applied to pots of cast iron, cast or wrought steel.

CRUCIBLE FURNACE—Furnace in which metal is melted in crucibles.

CRUCIBLE LIFTER—A device for lifting and holding a crucible.

CRUCIBLE POURING DEVICE—An apparatus for holding a crucible during the pouring operation.

CUPOLA—Stack-type melting unit in which metal is melted in direct contact with the fuel.

CUPOLA BLOWER—A machine which compresses a large volume of air at low pressure for operation of the cupola.

CUPOLA CHARGING MACHINE—Equipment for transporting raw materials to and discharging them into the cupola.

CUPOLA CONTROL EQUIPMENT—Devices for controlling the quantity of air blown into a cupola.

CUPOLA DRAG—Device for pulling refuse from under the cupola after melting has been completed and the bottom dropped.

CUPOLA DUST ARRESTER—A device attached to the stack of a cupola which removes dust and sparks from the outgoing gases.

CUPOLA LIGHTER—An oil or gas-fired torch used for igniting the cupola bed.

CUPOLA SPARK ARRESTER—See cupola dust arrester.

CUPOLA TENDER—The person who has charge of operating the cupola.

CUTOFF MACHINES, ABRASIVE—A machine using a thin abrasive wheel and employed in cutting off gates and risers from castings or similar operations.

CUTTER, GATE—A piece of sheet metal or other tool for removing a portion of the sand in a mold to form the gate or metal entrance into the casting cavity.

CUTTER, SAND—See sand cutter.

CUTTER, SPRUE—A piece of metal tubing or other tool used to remove a portion of the sand from a mold to form the sprue or passage from the exterior of the mold to the gate. Also a machine used for shearing sprues and gates from castings.

CYANIDING—Surface hardening of iron-base alloys by carbon or nitrogen absorption through heating at a suitable temperature in contact with a cyanide salt followed by quenching.

DABBER—A projecting member on an arbor or plate.

DAMPING CAPACITY—The ability to absorb vibration. More accurately defined as the amount of work dissipated into heat by a unit volume of material during a completely reversed cycle of unit stress.

DAUB—To coat or plaster the inside of a cupola at the melting zone or the inside of a ladle with a refractory mixture.

DECARBURIZATION—Removal of carbon from a ferrous alloy by the oxidizing action of media which may be gaseous, liquid or solid.

DEGASIFIER—A material employed for removing gases from metals and alloys.

A GLOSSARY OF TERMS EMPLOYED IN THE FOUNDRY

DELTA IRON—An allotropic (polymorphic) form of iron stable above 2550 F, crystallizing in the body-centered cubic lattice.

DENDRITE—A crystal formed during the solidification of a metal or alloy characterized by a branching structure like that of a fir tree.

DEOXIDIZER—A material used to remove oxygen or oxides from metals and alloys.

DESULPHURIZER—A material used to remove sulphur from molten metals and alloys.

DEVIL'S CLAW—A hook for rapid attachment to a chain.

DIE CASTING (VERB)—Pouring molten metal under pressure into metal molds.

DIE CASTING (NOUN)—Casting resulting from die casting process.

DIFFERENTIAL HARDENING—Hardening conducted in such a way that various portions of a casting or other object are hardened to varying degrees. For example, quenching one portion and allowing the remainder to air cool.

DIRECT CASTING (NOUN)—Casting poured direct from molten blast furnace metal.

DOWEL—A short pin of metal, wood, etc. used to join two pieces of material together.

DRAFT—Taper allowed on the vertical faces of a pattern to permit removal from the sand mold without excessive rapping and tearing of the mold walls.

DRAG—The lower or bottom section of a mold or pattern.

DRAW—See tempering.

DRAWBACK—Section of a mold lifted away on a plate or arbor to facilitate removal of the pattern.

DRAW BAR—A bar used for lifting the pattern from the mold. Also car connection.

DROP BALL—A heavy weight usually in ball or pear shape which is dropped from a height to break large pieces of scrap.

DROP BOTTOM CUPOLA—Cupola equipped with hinged doors on the bottom.

DROPPING THE BOTTOM—Removal of the supporting props under the cupola bottom doors to permit emptying of the remaining contents.

DROP OFF—See drop out.

DROP OUT—Sand falling from the cope of a mold.

DRUM, MAGNETIC—An electrically energized pulley or drum used for removing magnetic materials from sand, nonferrous borings and turnings, etc.

DRYING PLATE—See core plate.

DRYING STOVE—A stove or oven for drying molds or cores.

DRY SAND MOLD—A mold made of prepared molding sand dried thoroughly before being filled with molten metal.

DUCTILITY—The property permitting permanent deformation by stress in tension without rupture.

DUMP BUCKET—A box or other vessel for carrying materials arranged so that its contents may be discharged easily and rapidly.

ELASTIC LIMIT—The greatest stress which a material can withstand without permanent deformation after complete release of the stress. For commercial purposes elastic limit is considered as yield srtength.

ELECTRIC FURNACE (OVEN)—A furnace (oven) in which the heat is supplied by electric power. Types include arc, induction, resistance.

ELECTRODE, GRAPHITE OR CARBON—Graphite or carbon compressed under high pressure into solid cylinders or rods of various diameters and lengths and used to maintain the arc in electric arc furnace, arc lamps, carbon arc welding, etc.

ELECTRODE, WELDING—A metal or alloy in rod or wire form used in electric arc welding to maintain the arc and at the same time supply molten metal or alloy at the point where the weld is to be accomplished.

ELEVATOR—A device for raising or transporting materials from one level to another.

ELONGATION—The amount of permanent stretch before rupture; usually expressed as a percentage of the original gage length such as 15 per cent in 2 in.

ENDURANCE LIMIT—A limiting stress below which the material will withstand without rupture and indefinitely large number of cycles of stress.

ENDURANCE RATIO—The ratio of endurance limit to the ultimate tensile strength of the material.

EUTECTIC—The alloy which has the lowest melting point possible for a given composition.

EUTECTOID—A solid solution of any series which cools without change to its temperature of final composition.

EXHAUST SYSTEM—An arrangement of ducts or pipes and fans for removing air from one or more points and discharging it into the atmosphere.

EYE SHIELD—A protective device for the eyes which does not obstruct vision.

FACING—Refractory material applied to the face of a mold.

FACING SAND—Specially prepared sand in the mold adjacent to the pattern to produce a smooth casting surface.

FALSE CORE OR COPE—Takes the place of the cope.

FAN—A machine in which revolving vanes or blades create a current of air.

FATIGUE LIMIT—Usually synonymous with endurance limit.

FEEDER—See feed head.

FEEDER, SAND—A device for discharging a uniform thickness of sand on to a belt or other conveying equipment.

FEED HEAD—A reservoir of molten metal provided to compensate for contraction of metal as it solidifies, by the feeding down of liquid metal to prevent voids. Also called a riser.

FERRITE—Iron practically carbon-free. It forms a body-centered cubic lattice and may hold in solution considerable amounts of silicon, nickel or phosphorus; hence term also is applied to solid solutions in which alpha or delta iron is the solvent.

FERROALLOYS—Alloys consisting of certain elements combined with iron, and used to increase the amount of such elements in ferrous metals and alloys. In some cases the ferroalloys may serve as deoxidizers.

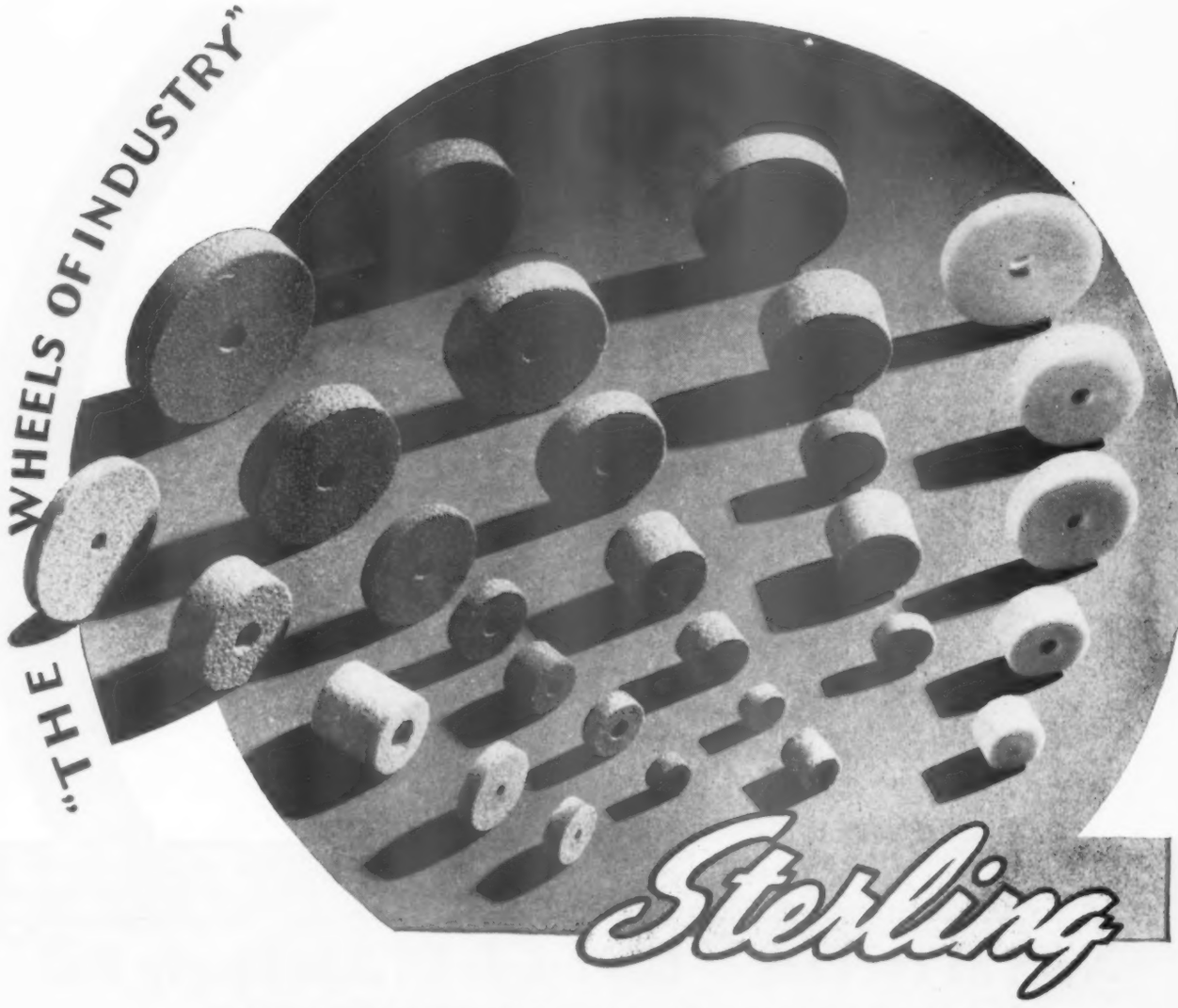
FERROBORON—An alloy of iron and boron containing about 10 per cent boron.

FERROCHROMIUM—An alloy of iron and chromium available in several grades containing from 66 to 72 per cent chromium and from 0.06 to 7 per cent carbon.

FERROMANGANESE—An alloy of iron and manganese containing from 78 to 82 per cent manganese.

FERROMOLYBDENUM—An alloy of iron and molybdenum containing 58 to 64 per cent molybdenum.

(To Be Continued)



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OBITUARY

W. B. LAKE, 76, chairman and managing director of Lake & Elliott Ltd., Braintree, Essex, England, which he founded, died Dec. 29. Mr. Lake developed his company into one of the leading steel foundries in Great Britain, being the first to use the electric furnace

W. B. LAKE

and sandslinger in the production of steel castings in that country. He joined the Institute of British Foundrymen in 1922, was president of the London branch in 1929, and in 1939 became president of the institute. He also took a prominent part in the formation of the British Steel Castings Association. Mr. Lake was well known to many American foundrymen through his activities in international foundry congresses.

* * *

E. Clay Howell, until recently head analyst of the Malleable Division of the Castings Section, Office of Price Administration, Washington, died Dec. 5 at his home in Arlington, Va. Mr. Howell was manager of the Canton, O., plant of the Dayton Malleable Iron Co., until it was closed in 1932, when he went to California and was in business with his brother for two years. He then became engineer with the Malleable Founders' Society, Cleveland, where he remained three years, leaving to join Lake City Malleable Co., Cleveland, for a year. Mr. Howell was plant manager of the Haven Malleable Castings Co., Cincinnati, prior to going with the OPA last year.

* * *

Alfred E. Congdon, 82, died Dec. 12 at the home of his daughter in Newport News, Va. The burial was at his old home in Hancock, Mich., Dec. 14. Mr. Congdon was born in Wales and as a child came to the United States with his parents and other members of the family. Presence of friends and relatives in the "copper country," where every mine captain was a *Cousin Jack* from Wales and Cornwall, induced the family to settle in Hancock. At an early age he entered the foundry and became a foreman in his early 20's. With the exception of a period of several years before, during and after World War I, when he served as foundry superintendent with the Port Arthur Shipbuilding Corp., Port Arthur, Ont., he remained in Hancock until he retired about ten years ago. In addition to a reputation as a highly skilled foundryman in the production of large, heavy gray and white iron castings for the copper mines, mills and smelters, he established in his prime records for weight lifting never equalled before or since.

* * *

George Williamson, 74, research engineer for McWane Cast Iron Pipe Co., Birmingham, since 1921, died Dec. 27, in that city. A native of Newcastle-on-Tyne, England, Mr. Williamson came to this country in 1916 as research engineer for American Cast Iron Pipe Co., Birmingham, joining McWane Cast Iron Pipe Co. when it was formed in 1921. With J. R. McWane, president of that company, he worked on numerous inventions and improvements of importance to the cast iron pipe industry.

* * *

Frank S. Warzeski, 61, vice president of the Linde Air Products Co., a unit of Union Carbide & Carbon Corp., New York, died Dec. 21 in Montclair, N. J. He joined Union Carbide in 1912 as an engineer with Linde Air Products Co., and successively was general superintendent, works manager and vice president of that company and held other similar positions with subsidiaries of the parent company.

* * *

Harold Rossum, recently a sales representative for the Lake City Malleable Co., Cleveland, died Dec. 15, at his home in Wayne, Pa. Mr. Rossum was connected with National Malleable & Steel Castings Co., at Chicago, for many years, and later was with the American Chain Co., at York, Pa. Since his recent resignation from that company he had represented the Lake City Malleable Co.

* * *

Irus H. Wells, 84, chairman, Chicago Foundry Co., Chicago, a company which he founded in 1905, died Dec. 19 in that city. One of the older foundrymen in the Chicago district, he had been a member of the old Chicago Foundrymen's Club, predecessor of the Chicago Chapter, AFA.

* * *

Frank Schmoll, 59, president of the Frank Schmoll Metal Products Corp., manufacturer of architectural bronze castings, Mt. Vernon, N. Y., died Dec. 6 in that city.

* * *

Albert E. Rogers, 61, president and founder of the Rogers Pattern & Foundry Co., Los Angeles, died Dec. 22, in that city. He had operated the foundry company which bears his name for 28 years.

* * *

John W. Keller, 84, formerly chief engineer, General Steel Castings Corp., Granite City, Ill., died recently in that city.

* * *

Joseph C. Green, 68, owner of the Joseph C. Green Pattern Works, Detroit, died Dec. 17 at his home in that city.

Veteran Employees Honored

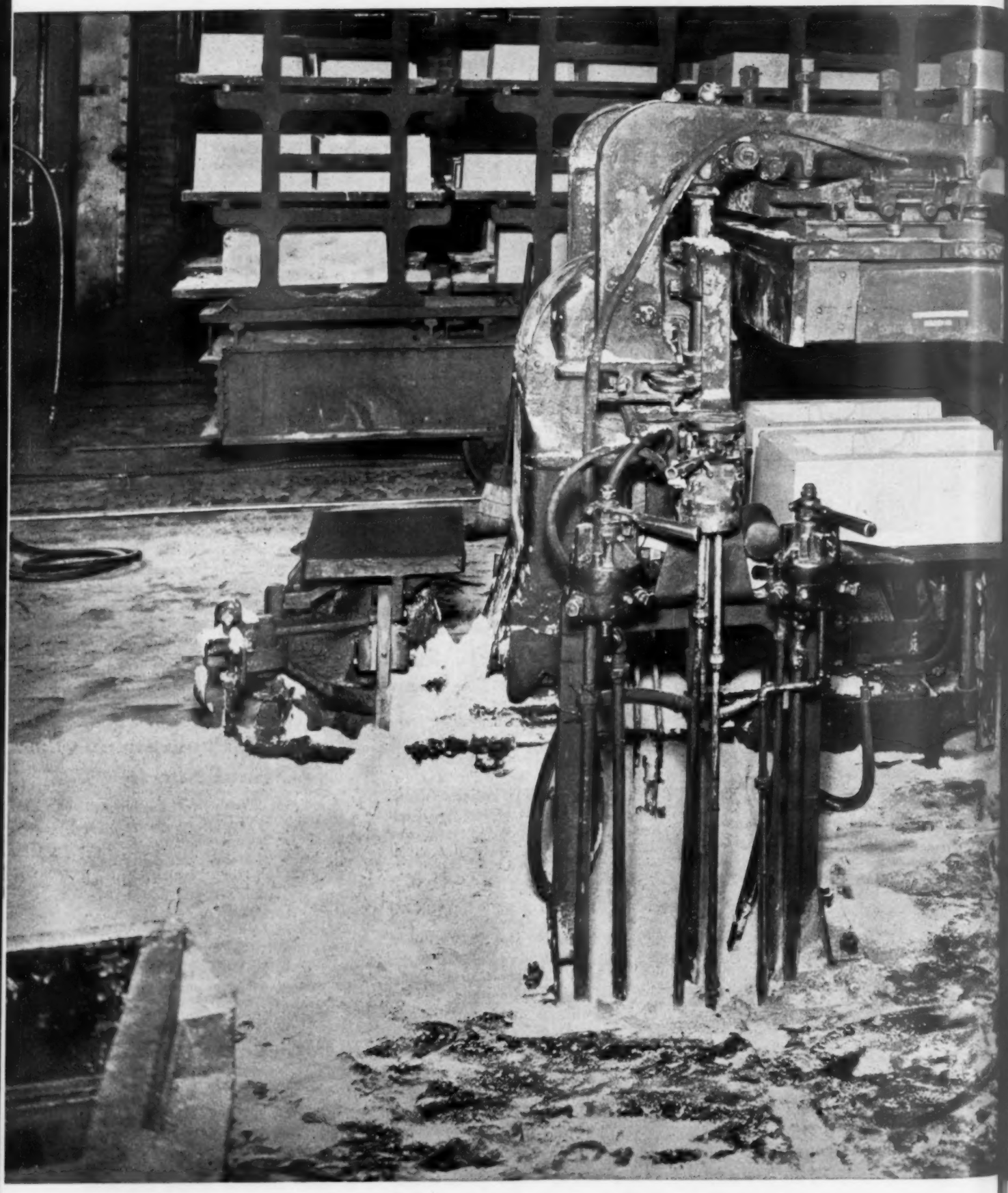
At a meeting held Dec. 20, 22 employees of the Granite City, Ill., plant of American Steel Foundries were presented with gold watches in recognition of 25 years' service with the company, and admitted to the Veterans Club of the company, bringing the total membership up to 153. Following the presentation, dinner was served to the entire membership and the following officers for 1946 were elected: M. L. Edwards, president; George Herl, vice president, and Clara M. Hoelscher, secretary.

Research Program on Z-Metal Starts

A program of research on the patented malleable iron known commercially as Z-Metal has begun in the metallurgical laboratories of Battelle Memorial Institute, Columbus, O. Sponsored by the newly organized Z-Metals Research Institute Inc., a group of foundries which has been licensed by Z-Metals Inc., the program will include both fundamental and practical research on Z-Metal, covering melting, alloying, casting and heat treatment.

Offers Analysis of Business Credit

A bulletin, entitled "Credit Sources for Small Business," has been issued by the Department of Commerce which discusses in detail types of credit extended by banks, industrial banking companies, small loan companies, etc. The booklet, designed for widespread distribution among small business men, may be obtained from Superintendent of Documents, Washington 25, or from Department of Commerce field offices at 15 cents a copy.



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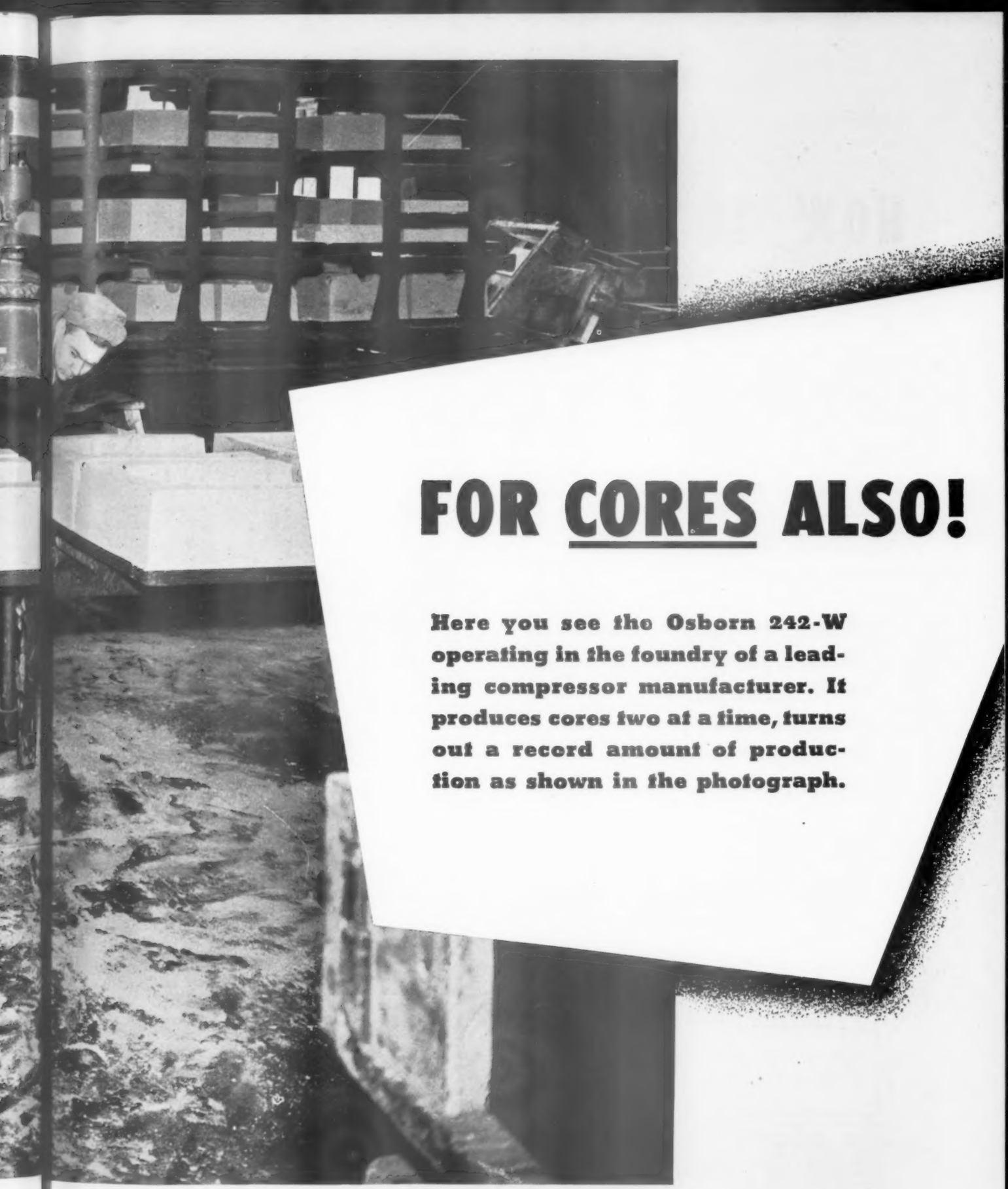

FOR CORES ALSO!

Here you see the Osborn 242-W operating in the foundry of a leading compressor manufacturer. It produces cores two at a time, turns out a record amount of production as shown in the photograph.

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MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

HOW TO CAST INGOT MOLDS

By PAT DWYER
Engineering Editor
THE FOUNDRY

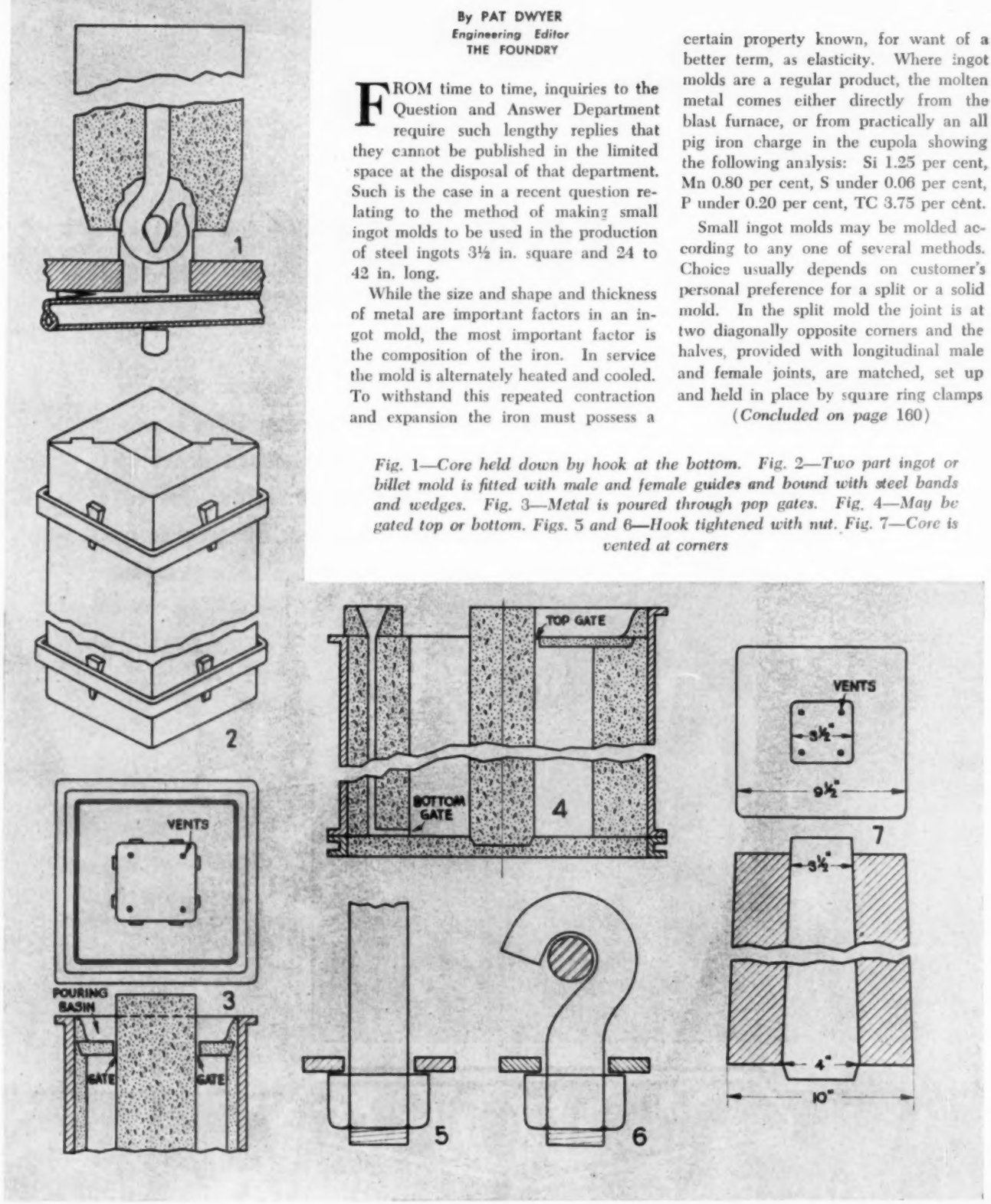
FROM time to time, inquiries to the Question and Answer Department require such lengthy replies that they cannot be published in the limited space at the disposal of that department. Such is the case in a recent question relating to the method of making small ingot molds to be used in the production of steel ingots 3½ in. square and 24 to 42 in. long.

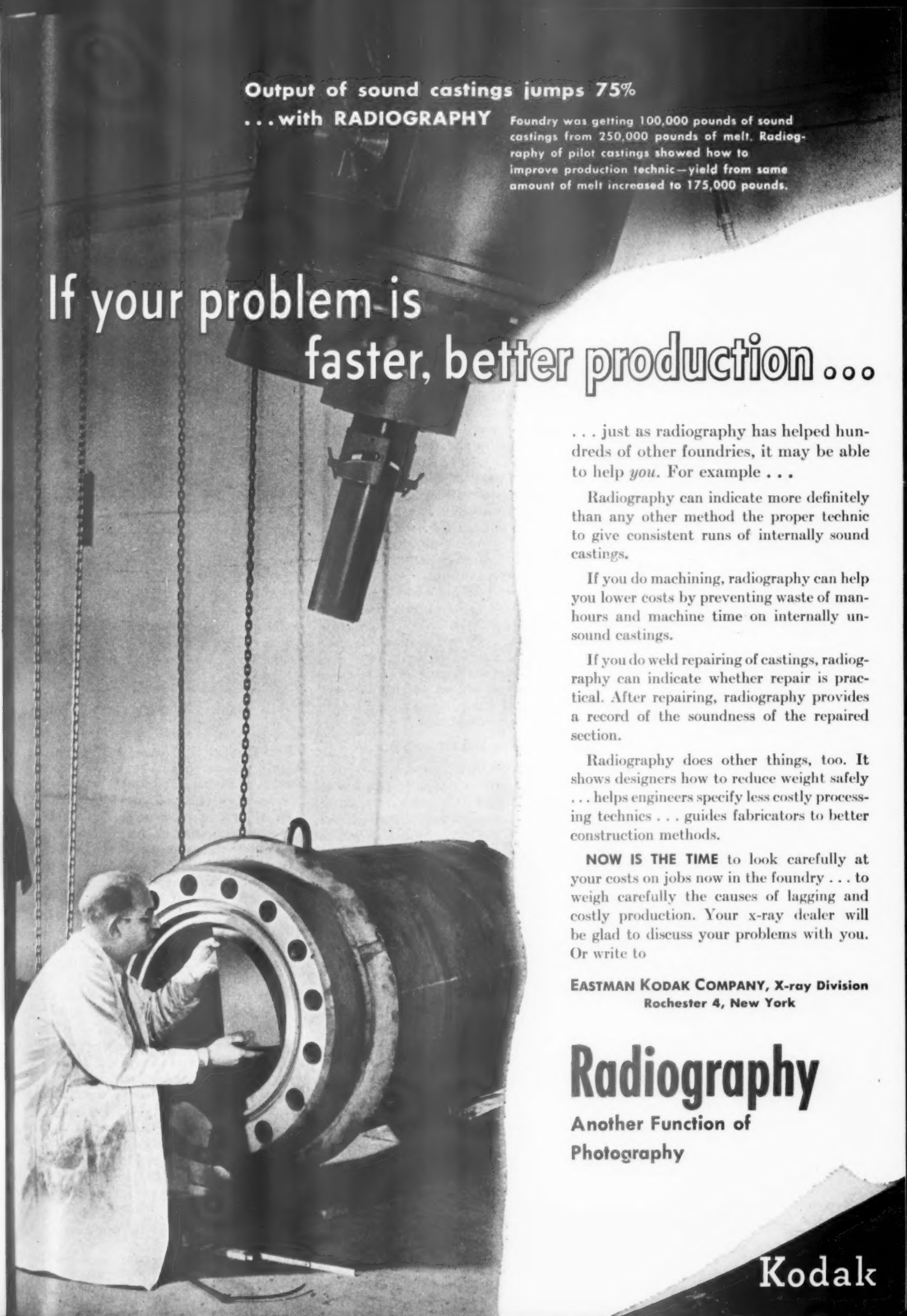
While the size and shape and thickness of metal are important factors in an ingot mold, the most important factor is the composition of the iron. In service the mold is alternately heated and cooled. To withstand this repeated contraction and expansion the iron must possess a certain property known, for want of a better term, as elasticity. Where ingot molds are a regular product, the molten metal comes either directly from the blast furnace, or from practically an all pig iron charge in the cupola showing the following analysis: Si 1.25 per cent, Mn 0.80 per cent, S under 0.06 per cent, P under 0.20 per cent, TC 3.75 per cent.

Small ingot molds may be molded according to any one of several methods. Choice usually depends on customer's personal preference for a split or a solid mold. In the split mold the joint is at two diagonally opposite corners and the halves, provided with longitudinal male and female joints, are matched, set up and held in place by square ring clamps

(*Concluded on page* 160)

Fig. 1—Core held down by hook at the bottom. Fig. 2—Two part ingot or billet mold is fitted with male and female guides and bound with steel bands and wedges. Fig. 3—Metal is poured through pop gates. Fig. 4—May be gated top or bottom. Figs. 5 and 6—Hook tightened with nut. Fig. 7—Core is vented at corners





Output of sound castings jumps 75%
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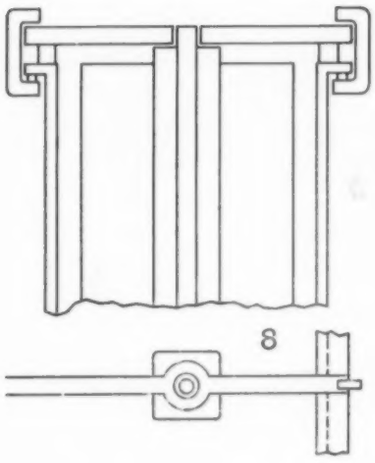

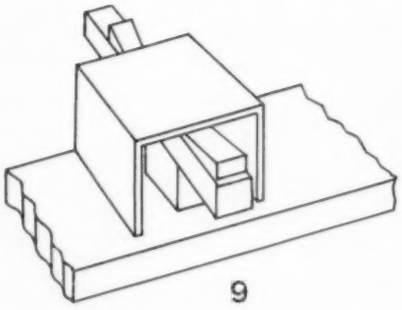

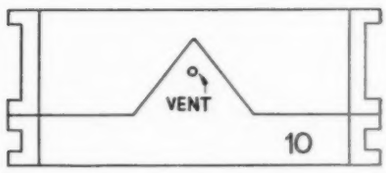

Figs. 8 and 9—Center core is held in place by bar laid across the top, with the ends wedged in pockets attached to upper flange of the flask. Fig. 10—The half ingot mold is cast in a flask with special ends

(*Concluded from page* 158)

and wedges, as shown in Fig. 2. The pattern for each half is molded face down to leave its own core. The core is vented by one or two long rods pulled through the end of the flask before the pattern is drawn. A coating of plumbago is brushed on the core to impart a smooth face to the casting. Metal from a single sprue enters the mold through two gates at one end so that the core is covered evenly from both sides. Incidentally, the flask ends are cut to correspond to the shape of the pattern.

One objection to split molds and to solid molds cast horizontally, is that there usually is a slight difference in the density of the metal on the upper and lower members. This lack of homogeneity may shorten the active life of the mold. The solid mold may be molded and cast horizontally or vertically, but the vertical method most nearly meets theoretical requirements. All large molds are cast in a vertical position. Where the mold is made horizontally, the pattern is provided with a core print at each end. The core may carry its own prints to fill the gaps at either end, or small block stop-off cores may be placed in position after the main core is lowered into place in the mold. A stiff steel bar is placed in the center of the core to prevent it from springing when the mold is filled with metal. The inside face of the casting must be clean and absolutely straight. No chaplet is allowed.

The best method of making the casting is to pour it while in a vertical position. The mold may be made either horizontally or vertically and may be gated either at the bottom, as in orthodox ingot making practice, or on top as in pipe making practice. The core is tapered from 3½ in. at the top to 3¾ in. at the bottom. Since the pattern is tapered to correspond, the main part of the mold is made in the cheek part of the flask which is lifted off and turned over for extraction of the pattern. The drag face is perfectly flat with a depression in the center to serve as a core print. The core is anchored in place by a hook extending through a hole in the bottom board or plate and tightened by a rod and wedge, as shown in Fig. 1, or by other methods illustrated in Figs. 5, 6, 8 and 9.

If the customer has no objection to a more or less rough top, the metal may be poured directly into the open top of the mold. Otherwise the top of the mold is covered by a cake core sitting in a suitable print. A large opening in the center of the covering core holds the square body core accurately in position. A number of small pop gates close to the center core allow the metal to slide down without touching the green sand mold face. The gates are fed by a suitable pouring basin.

Pour Metal Through Cup

When the time comes to pour steel into the ingot molds it is advisable to use a pouring cup, particularly if the steel is poured through a nozzle in the bottom of the ladle. No trouble will be experienced with a clean stream, but occasionally with a leaking stopper or a nozzle not spotted accurately, the metal will spatter over the top of the mold and cause trouble in removing the ingot.

In some plants the core arbor and base plate are handled as a unit. In other plants the base and core arbor are assembled and taken apart each time a casting is made. A recess in the base is filled with a flat dry sand core, or with green sand rammed and skin dried. Usually there is sufficient heat in the base to dry this thin body of sand. The object is to provide a sand face for the first metal entering the mold. Molds and cores are dried according to several methods. In one the jackets and cores are loaded on cars and placed in an oven. In other places the cores are dried in an oven, but the jackets are set up on a battery of stands bearing a close resemblance to the great masterpiece turned out by Chic Sale's rural builder. A coke fire or gas jet in each unit quickly dries the sand in the jacket. In another installation the jackets are loaded on cars and placed in an oven, while the cores are suspended by the necks in another oven. In the steel mills, the ingot molds sit on thick cast iron stools, either on the floor or mounted on buggies in a train that passes under a stationary ladle.

Articles on ingot mold foundry practice appeared in THE FOUNDRY Sept. 1, 1919; March 15, 1922; Feb. 15, 1924; Sept. 15, 1929. An article describing the foundry methods and equipment in a prominent eastern foundry will appear in an early issue.

Booklet Issued By Steel Foundry

Distributed recently by the Harrison Steel Castings Co., Attica, Ind., a profusely illustrated booklet 8½ x 11½ inches of 41 pages, presents a wide selection of views in and around the plant. An airplane view occupies the entire area on the inside of the front cover. An excellent photo of the founder, J. W. Harrison, and a brief history of the company and plant since their inception in 1906 are presented on the first page. Succeeding pages constitute a pictorial trip through the foundry, showing views of various departments and operations, types of castings manufactured and their uses, castings that form the heart of so many machines that will help build a better world for the future. A list of the pictures includes: Raw materials yard; main foundry bay; open hearth furnaces; molding machines; core room; laboratory; cleaning room; heat treating department; castings in wide variety; machines in which steel castings are incorporated and in use during the recent war in the far parts of the world; pattern shop; main office and recreation room for employes. View on the inside of the back cover shows the honor roll with names of nearly 400 employes who served with the armed forces.

"Yes, I know, but—how will *Industrial* LOGISTICS* save anything in our Foundry?"

So do *we* know. Your only reason for buying an Elwell-Parker System will be the conviction that the investment will pay greater returns than the cash can earn if kept—or invested elsewhere.

All right. Industrial Logistics is the soundly-planned program of operation by which Elwell-Parker Electric Trucks, Tractors and Cranes can earn those greater returns by cutting out wastes. This simple plan is the product of Elwell-Parker's long years of knowing-how—gained through the successful development of Load-Handling Systems for Companies representing *300 branches of peacetime industry.*

Every business *is* different; therefore, Systems for handling each Company's loads should be individualized too. At your Foundry the Elwell-Parker Materials-Handling Consultant will study all of your load-handling operations, from the delivery of supplies at your Receiving Department to final handling of cleaned castings. Then he will apply every resource in his own long experience — plus *ours* — to laying out a Truck System that will effect maximum economies from the day you put it to work.

Learn what Industrial Logistics can do for *your* Foundry. Set the appointment, and your nearby E-P Man will be there to meet you and your Foundry Executives—bringing valuable information gained through successful foundry experience throughout the United States. The answers to "how will it save anything for *us?*" will be forthcoming—*with proof!*

The Elwell-Parker Electric Company, 4220 St. Clair Avenue, Cleveland 14, Ohio.

* The science of assembling and handling Foundry materials to insure maximum economies at every stage of (a) Procurement, (b) Production and (c) Distribution, using Elwell-Parker Electric Trucks, Tractors and Cranes;

Employing the correct containers (Boxes, Barrels, Bags or Bales) in Master Unit Loads, on Pallets or Skids;

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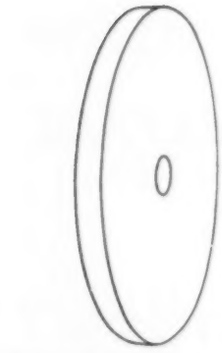
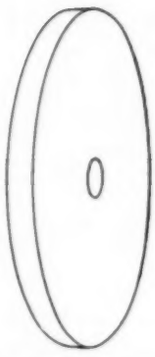
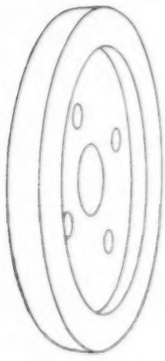
Established 1893



SILICON CARBIDE



ALUMINUM OXIDE



DIAMOND

What doesn't SCIENCE know about abrasives?

When you look back on what Science has discovered in the past few years to give you better grinding wheels, there is a temptation to think there is not much left to learn. Science however, never stops its endless search into the mysteries of abrasives.

In our own laboratory, engineers and chemists are daily studying grinding problems and Abrasive Products by CARBORUNDUM. As a result, some of the hard and fast rules of a couple of years ago regarding the choice of abrasives for grinding wheels are now outmoded.

There are many special conditions which can affect the choice of abrasive wheels. It's a costly practice to assume that what works best on one job will turn out as well on another.

A different recommendation can mean faster feed, or a more desirable finish. The change can show up in lower production cost.

Give your CARBORUNDUM salesman or our distributor's representative a chance to help on your wheel selections. He has the advantage of being part of a well-knit organization of experts whose experience comes from handling thousands of new grinding problems each year. Supporting each recommendation is the knowledge of skillfully trained engineers and laboratory technicians.

You can save time and trouble by asking a CARBORUNDUM representative's advice on grinding wheels. The Carborundum Company, Niagara Falls, N. Y.

A good rule for good grinding . . .

CALL IN CARBORUNDUM

TRADE MARK

ABRASIVE WHEELS
Silicon Carbide
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Diamond

COATED AND BONDED ABRASIVES
Paper and Cloth Combination
Sheets, Rolls, Discs
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ABRASIVE GRAINS AND COMPOUNDS
for:
Polishing
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WISCONSIN CONFERENCE

To Be Held in Milwaukee Feb. 7-8

NINTH annual Regional Foundry Conference under the joint auspices of the Wisconsin Chapter of the American Foundrymen's Association and the University of Wisconsin will be held at the Schroeder Hotel, Milwaukee, Feb. 7-8.

Beginning with the opening address by F. Ellis Johnson, dean, college of engineering, University of Wisconsin, a wide variety of subjects relating to various foundry problems will be presented by speakers particularly well qualified in their respective fields. There will be 24 separate sectional meetings, 4 each for the steel, malleable, gray iron, nonferrous, pattern and technical groups. In addition, two general meetings will be held, one on foundry costs and another describing a metallurgist's view of Europe.

For the luncheon and dinner meetings speakers of national repute are scheduled.

David Zuege, Sivyer Steel Casting Co., Milwaukee, is chairman of the conference committee. Russell J. Anderson, Belle City Malleable Iron Co., Racine, Wis., and Prof. E. R. Shorey and Prof. George Barker, University of Wisconsin, are associate chairman.

Details of the program follow:

Thursday, Feb. 7

9-10 a.m.—Registration.

10-10:30 a.m.—Opening address, Dean F. Ellis Johnson, University of Wisconsin.

10:30-12 noon—General meeting; "Foundry Costs," Ralph Lee, Grede Foundries, Milwaukee.

12 noon—Luncheon meeting; speaker, Dr. E. B. Fred, president, University of Wisconsin.

2-3:30 p.m.:

Steel; "Sand Reclamation," E. C. Jeter, Ford Motor Co., Detroit.

Gray Iron; "Cupola Operation," Ralph Clark, Electro Metallurgical Sales Corp., New York.

Malleable Iron; "Report on Annealing," James H. Lansing, Malleable Founders' Society, Cleveland.

Nonferrous; "Defects in Non-ferrous Centrifugal Castings and Their Elimination," Nathan Janco, Centrifugal Casting Machine Co., Tulsa, Okla.

Patterns; "Core Blowing Equipment," Round Table Discussion.

Technical; "Effects of Alloys in Ferrous Metals," George Watson, Electro Metallurgical Sales Corp.

3:40-5:10 p.m.:

Steel; "Steel Foundry Practice," Howard F. Taylor, Naval Research Laboratory.

Gray Iron; "Scrap Clinic," A. Lebesch, Allis-Chalmers Mfg. Co., F. Kulka, Motor Casting Co., Paul Woehlke, Grede Foundries, Milwaukee.

Malleable Iron; "Study of Present Annealing Methods," James Lansing, Malleable Founders' Society.

Nonferrous; "Core Blowing and Core Sand Mixtures", J. Howard Ware, Redford Iron & Equipment Co., Detroit.

Patterns; "Permanent Molds," V. J. Sedlow, Master Pattern Co., Cleveland.

Technical; "Influence of Mold Atmospheres", Joseph Gitzen, Delta Oil Products Co., Milwaukee.

6:30 p.m.—Banquet; "The Low Down on Washington High Ups," Strickland Gillilan.

Friday, Feb. 8

10-12 noon:

Steel; "Steel Foundry Metallurgy," Prof. George Barker, University of Wisconsin.

Gray Iron; "Metallurgy for Practical Foundrymen," W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee.

Malleable Iron; "Malleable Casting Production by Automatic Molding Machines," L. R. Shocken, Wm. H. Nicholls Co., Inc.

Nonferrous; "Nonferrous Foundry Practice," Wm. George, R. Lavin & Sons, Chicago.

Patterns; "Pattern and Casting Engineering," A. F. Pfeiffer, Allis-Chalmers Mfg. Co.

Technical; Joint meeting with Steel group.

12 noon—Luncheon meeting; speaker, Fred J. Walls, national president, AFA.

2-3:30 p.m. — *Steel;* "Centrifugal Casting in Nazi Germany," Dr. J. T. Mackenzie, American Cast Iron Pipe Co., Birmingham.

Gray Iron; "Practical Control for the Small Foundry," H. F. Scobie, AFA national office.

Malleable Iron; "Duplexing Malleable Iron," Frank Lepour, Belle City Malleable Iron Co., Racine, Wis.

Nonferrous; "Radiographic Detection of Flaws in Tin Bronze Castings," Dr. Blake Loring and William Baer, Naval Research Laboratory, Washington.

Patterns; "Making Pressure Cast Plates and New Pattern Equipment Methods," W. C. Kohler, Scientific Cast Products Co., Cleveland.

Technical; Joint meeting with Nonferrous group.

3:40-5:10 p.m.—General meeting; "A Metallurgist Views Europe from Beaches to Berlin," Carl Thieme, H. Kramer & Co., Chicago.

MOTION RADIOGRAPHY OF MOLD POURING

(*Continued from page* 96)

ciné projector, and so far all results have been printed. It is, however, intended to project the results, frame by frame, as the number of test pours increase.

At this stage it was felt that for a time the development of the method could be left and that the apparatus could be used for investigations. It may, therefore, be helpful to summarize the experimental data arrived at, and these are shown in the table on page 166. These conditions simply represent the best way of using the apparatus available to the author for the particular technique described, and no suggestion is made that they represent finality, nor that with different apparatus improved results could not be obtained.

The fact that the precise time of any development in the casting can be accurately determined is of the greatest importance, while individual examples of other details available are also shown. The practice so far has been to run the camera at a number of frames per second until the casting filled and then individual exposure made at intervals of 10 sec or so during the subsequent stages. This was mainly to economize on film and to make printing a practicable proposition. There were, however, two other important factors which influenced the decision. In one case, that of the formation of gas bubbles, the action was so quick that it was impossible to record their formation in detail, while in the other the growth of shrinkage cavities was so slow that interval pictures were quite sufficient. Referring to the formation of gas bubbles, it was noted that the bubbles all formed in the period that elapsed between one frame and another and, although it was quite sufficient for practical purposes, the problem of rapid reactions will have to be overcome by the development of a high-speed technique, suggested later.

The cinégraphs shown are all positive prints of the fluorescent screen, and for the purpose of description can be divided into three tones—namely, light, medium and dark. The lightest tone, the area receiving the most x-rays, is the empty mold and runner shape. The surrounding area of medium tone is the stand comprising the remainder of the mold, while the almost black tones are the areas of metal.

All the molds shown were run vertically with the exception of Fig. 7; in this case the core lay horizontally above the x-ray tube. The original size of all the molds was 11 x 9 in., and they were all poured with L33 at 720 C.

Figs. 1 and 2

(1) *Purpose.*—To observe effect of different operators pouring the casting.

(2 *Description of Mold.*—Bottom run wedge; ⅛-in. square gate, and open top.

(3) *Time Details.*—Completely filled: Fig. 1, 3 1/16 sec.; Fig. 2, 4¼ sec.

(4) *Remarks.*—The efforts of numerous people, with instructions to pour normally, were recorded in this test. The first 20 frames, or just over the first second of the two extremes, are shown.

Fig. 1 shows the jet action of a fast pour, with its attendant severe turbulence. The enveloping of air by the runner stream and the large surface area subject to oxidation are also clearly shown. It will be noted that even when the mold is nearly half full, the jet still has sufficient force to reach the top of the mold and, as in the earlier frames, only falls back of its own weight.

Fig. 2 has a much more restrained pour and is probably as slow as could be run without a broken runner stream. Even in this case, however, the jet has sufficient power to force through the accumulating metal.

It may not be visible in the reproductions, although the effect is apparent in Fig. 1, but the incoming stream can be seen as a darker area as it passes through the metal already in the mold. The stream is deflected and is particularly noticeable in Frame 15, Fig. 1. It is too

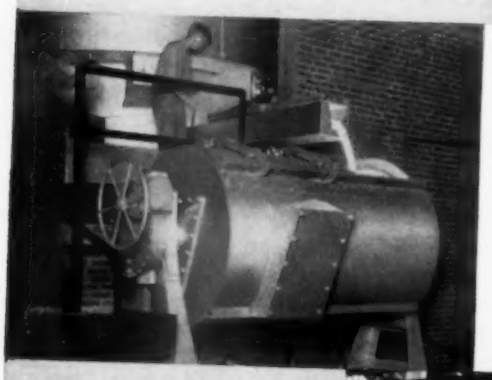
(*Concluded on page* 166)

WHITING Engineered

Whiting mechanical cupola charging equipment is available in a wide variety of types to meet the needs of large and small foundries.

Over 90% of the gray iron castings in the U. S. are poured with metal from Whiting Cupolas.

Hydro-Clone Cupola Spark Suppressors lower insurance rates by suppressing sparks with water.



Whiting U-Ladles are available in many types and sizes to give utmost convenience in mixing and desulphurizing.

Send for literature fully describing any of the following units of foundry equipment in which you are specially interested.

- Cupolas and Cupola Chargers
- Cupola Blowers and Accessories
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- Hydro-Arc Electric Furnaces
- Air Furnaces
- Rotary Furnaces
- Cradle Furnaces
- Side-Blow Steel Converters
- Coal Pulverizers
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- Desulphurizing U-Ladles
- Ladles and Ladle Handlers
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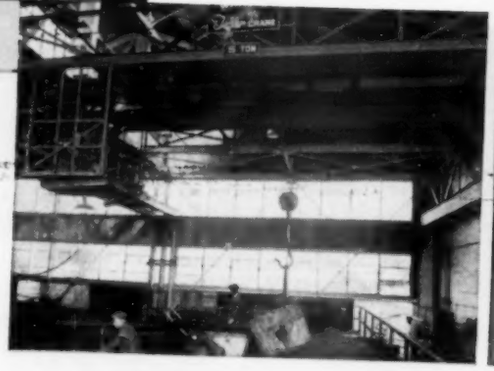
- Annealing Ovens

Hydro-Clone Dust and Spark Suppressors

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT



Whiting Ladles are engineered for long life and hard service—available in sizes and styles for every requirement.

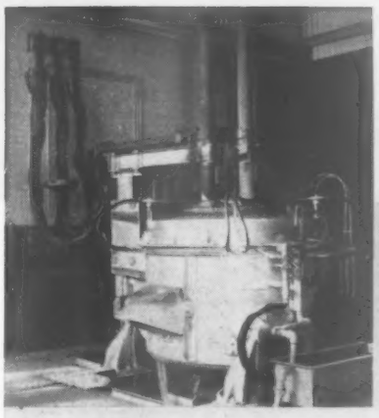
Whiting Duplexing Equipment provides hot metal continuously and at low cost. Above is a typical installation—cupola to air furnace.

Foundry Equipment

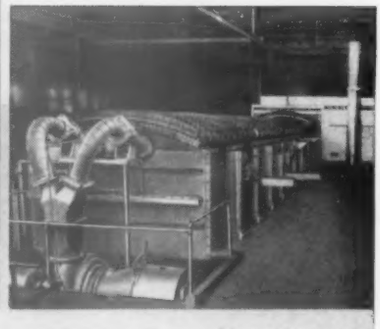
• Whiting has specialized in serving the metal trades for more than 60 years, providing new and better foundry methods and a wide range of improved equipment.

Whiting engineers are practical men—their experience and research have solved some of the industry's toughest problems, and contributed many innovations which have become standard foundry practice.

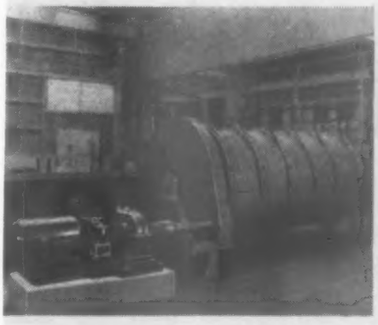
You can ask for help and get it from Whiting. Write us about your problems. Whiting Corporation, 15607 Lathrop Ave., Harvey, Illinois.



Hydro-Arc Furnaces give new, low-cost electric melting due to their instantly responsive hydraulic system of electrode positioning.



Malleable Iron Melting Furnace fired by pulverized coal. Whiting supplies furnaces, pulverizers, and burners.



Certain types of castings can be more economically cleaned in tumbling barrels than any other method. Whiting tumblers are ruggedly built for long life and low-cost operation.

Hydro-Clone Dust Suppressing Units use liquids to reduce the dust to harmless sludge. Available in sizes and styles for every foundry need.

The side-blow converter has proved a great asset to the war program in both direct and triplexing installations. Quality steel is produced at high speed and low cost to supply metal for continuous molding and pouring systems.

WHITING
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SIXTY YEARS OF SERVICE TO THE FOUNDRY INDUSTRY

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, and Washington, D. C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario.

(*Concluded from page* 163)

early to say why the stream is evident as an increased density.

Figs. 3 and 4

(1) *Purpose.*—To observe the effect of a swan-neck runner on different rates of pour.

(2) *Description of Mold.*—Swan-neck runner on piston casting with right-hand open riser.

(3) *Time Details.*—Completely filled: Fig. 3, 4 1/16 sec; Fig. 4, 2 5/16 sec.

(4) *Remarks.* — A number of these comparisons were made; the two sets given typify the restraining action of the swan-neck runner found in these tests. The first ten frames of two runs, with marked differences in rate of pour, are shown, and it will be seen that, although there are differences before the metal passes the swan neck, the relative positions of the metal flow are almost identical in subsequent pictures.

Figs. 5 and 6

(1) *Purpose.* — To observe effect of venting.

(2) *Description of Mold.* — Two rectangles with a common runner, the right-hand casting having ⅛-in. dia. vent from top right-hand corner. Both castings have ⅛-in. by ½-in. gate.

(3) *Time Details.*—Completely filled: Fig. 5, 10¼ sec for left casting; 9 1/16 sec for the right Group B, 5 5/16 sec for left casting; 4 9/16 sec for the right.

(4) *Remarks.*—The five frames taken as the casting was practically filled, show in each case how the air retards the flow of metal up the mold unless it is allowed to escape. The difference is more marked in Fig. 6, because of the faster pour; the permeability of the sand not being sufficient for the rapid escape necessary. It is rather extraordinary, but in Fig. 5 the casting having a vent shows more gas bubbles than the other, and this aspect is at present under investigation.

Fig. 7

(1) *Purpose.* — To observe effect of horizontal pour and growth of shrinkage cavities.

(2) *Description of Mold.* — Circular plate with rimmed bore and edge, ⅛-in. square gate.

(3) *Time Details.*— Completely filled in 12 sec. First shrinkage appears in 52 sec.

(4) *Remarks.*—These ten frames, taken at 10-sec intervals, show the growth of shrinkage cavities. The last cavity to appear is, by reference to earlier pictures, situated at the end of the runner jet and not close to the gate. This demonstrates quite conclusively that the hottest metal is found at the main point of delivery in the casting and not at the immediate junction between the gate and the casting.

The author wishes to express his thanks to the directors of Kent Alloys, Ltd., for permission to publish this paper, and to F. H. Hoult, general manager, for his help and encouragement.

Experimental Conditions

X-ray Equipment—Siemens Schuckert 140 kv set; target size 2.3 mm square two-valve rectification; run at 140 kv 8 ma; distance of target from mold, 1 ft 4 in.

Mold—Supinol AA. sand thickness, 1⅜ in.; maximum thickness of casting, ⅝ in. in L 33 alloy.

Fluorescent Screen—Levy West AYS; distance of screen to lens front, 2 ft 3 in.

Camera—Erneman 35 mm cine' camera fitted with f 1.5 Sonnar lens; driven by electric motor.

Film—Ilford GX.

Developer—Ilford Blue Label (I.D. 42) for 10 min. at 70 F.

Bromide Paper—Ilford glossy.

SHAKEOUT HANDLES LARGE CASTINGS

(*Concluded from page* 103)

Here, any remaining lumps are broken up and stray foreign matter separated out and consigned to a debris box.

In order to control sand permeability, varying amounts of the so-called fines are siphoned off through the medium of a curtain of air drawn through the screen. By varying the velocity and amount of air in the curtain, it is possible to control the amount of fines left in the sand.

Throughout the entire sand distribution system, each sand discharge or transfer point is hooded and exhausted. All sand handling apparatus is enclosed, and conveyor belts are rubber-stripped to prevent dust from escaping.

Two dust exhausters are employed, one handling dust generated in the shakeout cubicle, dust from the hoppers (the hoppers are kept at a slightly negative pressure) and dust from the apron feeder. The second unit handles dust from the fines control and all of the plow and transfer points in the sand distributing and storage system.

As useable sand particles cascade through the hexagonal screen, they fall onto a magnetic cross conveyor. A second magnetic pulley picks up any metal particles, rust, scale, nails, etc., which may have escaped the first scalping, and clean sand is delivered to the main cross conveyor belt. Meanwhile, any sand which may have been pulled along with the tramp metal is returned to the second magnetic belt.

The main cross conveyor belt discharges into the boot of a bucket elevator and is carried to the top of the sand runway between the foundry and the shakeout storage. There, by means of a flop gate, sand can be either directed back into the foundry for use or into two 250-ton salt-glazed-tile silos for storage.

A system of plows distributes the sand emptied into the storage silos and prevents coning in the center, allowing the maximum use of silo storage space.

Gates in the bottom of the silos are arranged so that sand from storage can be discharged onto the main cross conveyor belt and, through the medium of the bucket elevator, the flop gate and the foundry sand conveyor, can be delivered directly into the foundry sand preparation plant. Synthetic sand is used for molding and the sand is used over and over again.

The system is so arranged that it can be controlled entirely by a single individual, and it may be shut down from a number of emergency stop stations located at strategic points in the system.

The collection of dust at the point where it is generated through the use of modern sand handling and shakeout equipment, makes possible cleanliness which in the past was not associated with the general run of foundries; in fact, Worthington's Buffalo Works foundry interior is now painted white.

Take New Offices

Williams & Hansen, industrial management engineers, Milwaukee, have moved to new offices in the Commerce building, 744 North Fourth St., that city. The major part of the organization's work

H. R. WILLIAMS

W. S. HANSEN

since 1934 has been with foundries, developing and installing wage incentive and job evaluation plans, methods analysis, plant layout, production and cost controls.

McLain's To Continue

McLain's System Inc., for many years operated by the late David McLain, will continue under its present manager. I. V. Scanlan, at 236 East North Ave., Milwaukee.

IT'S *Four* FURNACES IN *One*

TEMPERING — ANNEALING — NORMALIZING — HARDENING

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1700°F.

The *Accurate* LINDBERG Super-Cyclone

Extremely accurate control is obtained throughout the Super-Cyclone's 350°F. to 1700°F. temperature range. This permits one furnace to be efficiently used for hardening, normalizing, annealing and tempering.

Utilizing the famous Lindberg 100% forced convection principle, the Super-Cyclone drives a tremendous volume of accurately heated air through the work at high velocity. This principle eliminates distortion due to radiant heat because the heat source is isolated. Temperature of the load is built up with rapid uniformity regardless of the load density or location in the chamber.

The Super-Cyclone's versatility makes it a thrifty asset to any plant. The use of fixtures which permit one operator to handle easily up to 6-ton loads effect further important savings in man-hours and operating costs.

Write today for complete and detailed information.

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Lindberg FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

Industry BRIEFS

GREDE Foundries Inc., Milwaukee, and the Lake Shore Engineering Co., Iron Mountain and Marquette, Mich., plan construction of a combined foundry and machine shop for joint production of light weight iron castings at Kingsford, Mich. It is expected that operation of the foundry and machine shop will be effected in from four to six months, and provision has been made for added construction.

• • •

Federated Metals Division, American Smelting & Refining Co., New York, has opened a new physical testing laboratory at its Whiting, Ind. plant, at a cost of $100,000, completely equipped with the latest developments in metallurgical equipment, including physical testing apparatus and modern spectrographic equipment. Don Graves has been put in charge of the new department.

• • •

Electric Auto Lite Co., Toledo, O., has acquired the freight car wheel foundry of the Mount Vernon Car Mfg. Co., Mount Vernon, Ill., division of H. K. Porter Inc., Pittsburgh. The foundry, which has been idle for three months, will be converted for other production.

• • •

Keokuk Electro-Metals Co. has established Keokuk, Iowa, as a basing point on all grades of high silicon silvery pig iron—14 to 18 per cent silicon range inclusive. Base price for carloads of the 14.01 to 14.50 per cent silicon grade is $48.75 per gross ton, with the usual differential of $1 for each additional 0.50 per cent silicon applying. Other base prices and basing points for this material are $45.50 at Jackson, O., and $46.75 at Buffalo.

• • •

Foundry equipment sales in November represented 416.6 per cent of the 1937-1939 monthly average, according to the Foundry Equipment Manufacturers Association. This compares with 457.8 per cent in October and 369.5 in November, 1944.

• • •

John Harsch Bronze & Foundry Co., Cleveland, producer of brass, bronze and aluminum sand castings, has established a department for production of permanent mold castings. It is headed by L. A. Kristoff, recently engaged in permanent mold work with Reynolds Metals Co., Springfield, Mass.

• • •

George Kreutz has bought out his partner's interest in the H. S. Cook & Co., successor to the New Burrell-Johnson Iron Co. Ltd., Yarmouth, Nova Scotia, and has enlarged the foundry to accommodate 30 molders. He is in position to handle a considerable volume of work from outside interests. The firm is in daily communication with St. John, N. B., and expects to have boat service with Boston and New York when shipping opens in the early spring.

• • •

Arlington Bronze & Aluminum Corp. has been incorporated to operate a foundry which is expected to be completed by next summer at 4700 East Wabash Avenue, Baltimore. The foundry will produce brass and aluminum castings, specializing in complete aluminum windows. Joseph O. Danko is president.

• • •

Conlon Corp., Cicero, Ill., maker of electric household appliances, has purchased control of the Moore Corp., Joliet, Ill., heater, furnace and combination range manufacturer. Bernard J. Hank, Conlon president, becomes chairman of the Moore Corp., and E. K. Priest continues as president. The Moore Corp operates a gray iron foundry.

• • •

Howell Foundry Co. Inc., Los Angeles, has been incorporated with $100,000 capital. Directors are Henry W. Howell and J. Robert Langston, both of Whittier, Calif., and W. Dean Howell of Pasadena, Calif. The new corporation is represented by Bewley & Knopp, Whittier, Calif.

• • •

Edward Valve & Mfg. Co. Inc., East Chicago, Ind., has changed its name to Edward Valves Inc. No changes in personnel or sales policies are involved. The company is a subsidiary of the Rockwell Mfg. Co., Pittsburgh.

• • •

Aircraft Foundry Co., Los Angeles, plans construction of a new concrete foundry building at 5314-5322 Pacific Blvd., Huntington Park, Calif., 53 x 138 ft, to cost $18,000.

• • •

Howard Foundry Co., 1700 North Kostner Ave., Chicago, plans construction of a foundry building 80 x 273 ft, to cost about $43,000.

• • •

Babbitt, Hotchkiss & Co., 1099 East Portage St., Sault Ste. Marie, Mich., has been incorporated to operate a foundry business by Donald G. Babbitt, 1517 Dorchester Ave., Birmingham, Mich.

• • •

E. F. H. Aluminum Foundry & Smelting Co., 3300 East 87th St., Cleveland, plans construction of a foundry addition, to cost $30,000, which will include molding, grinding and polishing rooms, air compressor, cleaning room and loading dock.

• • •

Continental Aluminum & Bronze Foundry Co., has been incorporated to manufacture aluminum and bronze cast-

(*Continued on page* 170)

NEW FOUNDRY: McNally Pittsburg Foundries Inc., wholly-owned subsidiary of the McNally Pittsburg Mfg. Corp., Pittsburg, Kans., manufacturer of coal preparation equipment, is operating this new 110 x 210-ft gray iron foundry. Said to be one of the most modern foundries in the Middle West, it is completely mechanized with material and sand handling equipment. Squeezers and roll-over machines provide for light molding, with sandslingers serving the heavy floor. Two cupolas provide for simultaneous production of alloy and plain gray iron castings weighing up to 15 tons. Foundry capacity is about 30 tons per day.

MOLDING MACHINES *and* VIBRATORS

FAST • FLEXIBLE
EFFICIENT • DEPENDABLE
PROFITABLE

SPO

GET THIS *Bulletin* ON SPO MOLDING MACHINES

No. 100 Series. Fast flexible machines for matchplate molds.

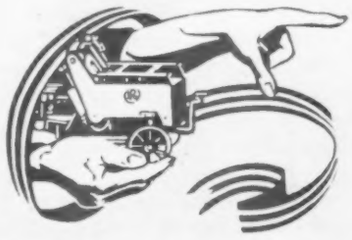
No, we don't offer *absolutely* every type and size of molding machine to meet *absolutely* every need and condition in *any* foundry today. That is hardly possible. Yet SPOs can and do account for the vast majority of those needs and conditions. Our general bulletin shown above pictures SPO Molding Machines as follows:

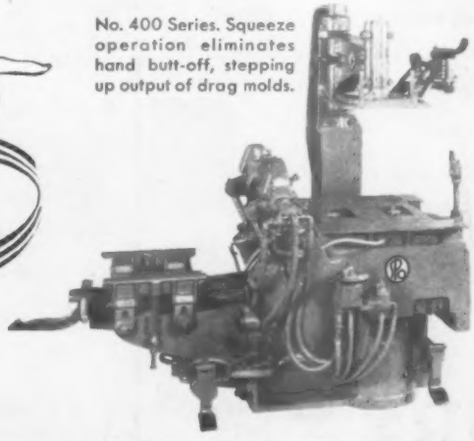
Types: Plain jolt, jolt squeeze, jolt strip, jolt squeeze strip, oscillate squeeze strip, roll-over draw, jolt roll-over squeeze draw, jolt rock-over draw, jolt strip rock-over draw. Portable or stationary models. Post or cantilever styles. Wide range of sizes.

In every series you will find the qualities you have come to expect of SPO; namely: speed, easy learnability, simplicity of design, compactness, minimum maintenance, profitable operation. The SPO line is shot through with practicality, being built by an organization with many years of practical foundry experience.

May we send you our General Bulletin?

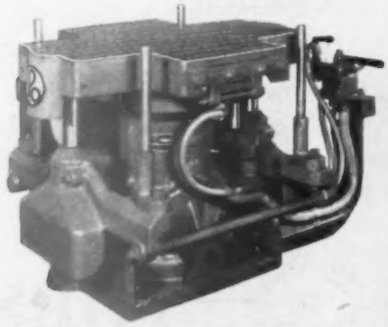
No. 200 Series. Profitable for both jobbing work and fast production of cope and drag molds.





No. 400 Series. Squeeze operation eliminates hand butt-off, stepping up output of drag molds.

No. 300 Series. A real "Handy Andy", because readily adapted to a wide variety of flask sizes and shapes.



SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND, OHIO

METAL CLEANING

two books that tell how to do it better

IMPACT CLEANING . . . . . .

by: W. A. Rosenberger

■ This 480 page book contains full information on the latest and most approved methods of impact cleaning, including blast-cleaning and sandblasting. It tells the reader of approved methods of cleaning under all conditions and for all types of products.

A practical book telling how to reduce cleaning expenses by application of proved methods.

In three parts: Part one covers Nozzle Blast Cleaning Equipment; Part Two, Mechanical Impact Cleaning; Part Three, Ventilation of Impact Cleaning Equipment . . . all profusely illustrated and cross-indexed for easy reference. "Impact Cleaning", $7* postpaid.

MODERN BLAST CLEANING AND VENTILATION . .

by: C. A. Reams

■ Mr. Reams, engineer, Ford Motor Co., has compiled this practical book from actual shop experience plus proved engineering information. His discussions of modern methods of blast cleaning and ventilating methods are applicable to all types of metal cleaning by the blast method.

Full information is given on selection of abrasives, abrasive cleaning methods, selection of equipment, abrasive reclamation, advantages and limitations, ventilation and reduction of industrial hazards, and scores of other helpful facts.

Illustrations and diagrams in this 213 page book increase its value to the plant engineer. "Modern Blast Cleaning and Ventilation", $4* postpaid.

*Orders for delivery in Ohio must be accompanied by an additional 3% to cover compulsory state sales tax.

THE FOUNDRY

THE PENTON PUBLISHING CO.

Book Department, Penton Building

CLEVELAND 13, OHIO

(*Continued from page* 168)

ings, by Harry F. Getler, 151 East 216th St., Euclid, O. The company has an option on a plant at Westford, Pa., and plans operations there.

• • •

Air Reduction Sales Co., New York, has started construction of a mechanical research laboratory at New Providence, N. J., for research and development of processes and apparatus for using industrial gases and the electric arc, particularly in the cutting, welding and treating of metals. The laboratory will have a floor area of 78,000 sq ft.

• • •

American Society of Heating and Ventilating Engineers plans expansion and operation of its research laboratory at 10700 Euclid Ave., Cleveland, to cost approximately $100,000. Principal research project of the laboratory, moved from Pittsburgh over a year ago, centers about removal of dust and fumes from factories.

• • •

McDonald Machine Shop, Moberly, Mo., has under construction near the Wabash railroad shops a foundry building, 40 x 84 ft, for casting and machine work. A pattern shed, 14 x 50 ft, and bins for coke and metals, are under construction between Hagood and Burkholder streets and adjacent to the Wabash right-of-way.

• • •

I. Schumann & Co., manufacturers of brass and bronze ingot, has begun construction of several modern brick, concrete and steel buildings for warehouse, smelting and office purposes at 4391 Bradley Rd., Cleveland, to cost approximately $200,000. E. C. Kaufman, who recently joined the company, is directing technical and engineering details.

• • •

Hercules Powder Co., Wilmington, Del., plans a postwar construction program covering all of the chemical manufacturing departments of the company, to cost $30 million. Construction of new plants and increased facilities will be completed within the next three years.

• • •

Foundry building of the National Iron Works, 2625 East Belt St., San Diego, Calif., is being rebuilt. The new structure, 80 x 132 ft in area, will cost $10,000.

• • •

Crucible Foundry Co. has moved its nonferrous foundry from 2615 Matthews St., Baltimore, into larger quarters at 5220 Pennington Ave. Francis J. Hastings is president.

• • •

Sumner Iron Works Ltd., Vancouver, B. C., Canada, is manufacturing the full

(*Concluded on page* 172)

SAYS THE PLANT ENGINEER . . .

YOUR JOB
CAN BE BIGGER TOO!

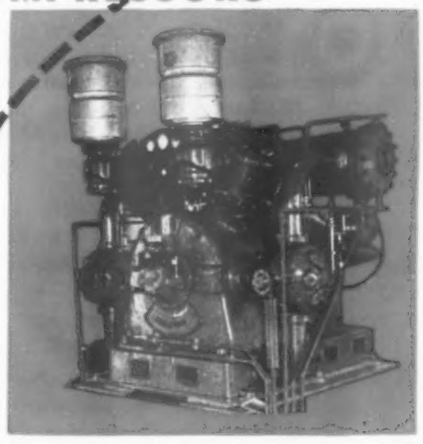
HERE'S WHAT HAPPENED WHEN I MAILED A COUPON LIKE THE ONE BELOW

1. By using the material received I was able to get approval for the purchase of a new, completely modern compressed air plant.

2. The Sullivan WN-114 that I bought required so little attention that I was given additional supervisory duties and more responsibility.

3. The management now has a much better understanding of me and my job.

SULLIVAN *100 Series* AIR COMPRESSORS



Sullivan, 100 Series, packaged, air-power plants are two-stage, double-acting, heavy-duty, continuous service compressors — much smaller than old style, bulky compressors of the same capacity — yet have operating economies exceeding those of the older units.

100 Series Compressors need only to be hooked up to power, water and air lines and they are ready for 24-hour per day constant and efficient service. They are particularly suitable for synchronous motor drive and extremely well adapted for drive from steam turbines or diesel engines. Offered in single and twin units with piston displacements from 378 C.F.M. to 3656 C.F.M. at pressures up to 125 p.s.i.

THIS CAN HAPPEN TO YOU

Send this coupon and you'll get all these FREE—a complete set of "DIVIDENDS," each of which discusses a different air compressor maintenance problem—a method of keeping your air compressor constantly operating at top efficiency—and a 52-page Booklet packed with vital information about air compressors. Sending this coupon may be the most important thing you've ever done for your future. Why not send it NOW.

SULLIVAN

THE WORLD'S FINEST AIR COMPRESSORS FROM ¼ TO 3,000 H. P.

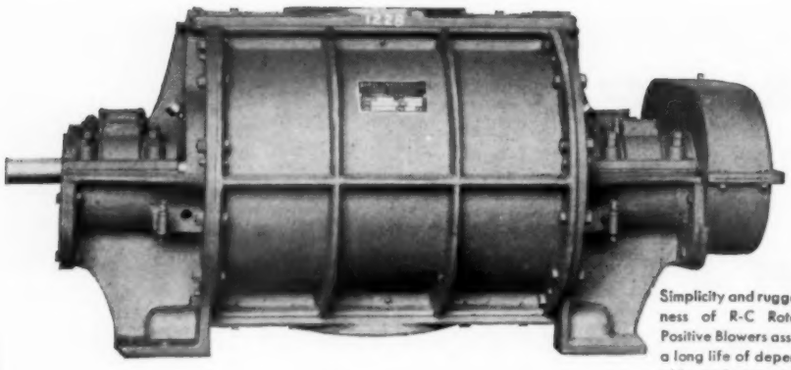
SIGN AND MAIL NOW
OR PLEASE WRITE ON COMPANY LETTERHEAD GIVING YOUR TITLE

SULLIVAN MACHINERY COMPANY, DEPT. 3-943 Woodland Ave., Michigan City, Indiana.

Please send me, without obligation, the complete set of SULLIVAN "DIVIDENDS" and your 52-page Booklet on air compressors.

NAME _____ TITLE _____

ADDRESS _____ CITY _____ STATE _____



Simplicity and ruggedness of R-C Rotary Positive Blowers assure a long life of dependable and economical operation.

You can bank on R-C

dual-ability

for dependable air supply

• Regardless of varying pressures in the cupola, there's no variation in air delivery from Roots-Connersville Rotary Positive Displacement Blowers. Their simple twin impellers deliver a predetermined amount of air with every revolution, to maintain correct temperatures and more uniform, high-quality melting. In other words, more profitable operation.

Because of their simple design and sturdy construction, R-C units maintain their rated capacities for many years. Almost complete freedom from maintenance means fewer shutdowns and production losses.

This *dual-ability* to design and build dependable blowers accounts for the R-C reputation for constantly fine performance, long life and low power costs.

Send for Bulletin 22-B-12 which explains the simple operation of R-C Rotary Positive Blowers. Our engineers are at your service for the selection of the correct R-C blower for your specific needs.

ROOTS-CONNERSVILLE BLOWER CORP.
One of the Dresser Industries
602 Madison Avenue, Connersville, Indiana

ROTARY POSITIVE

Soundness of this simple rotary principle has been proved for almost a century. It makes possible constant air volume regardless of pressure variations, so essential for successful cupola operation.

Where centrifugal blower characteristics are of advantage, R-C single or multi-stage units will serve you with fine performance, resulting from excellent modern design.

CENTRIFUGAL

Roots CONNERSVILLE SINCE 1854

ROTARY POSITIVE BLOWERS

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

(*Concluded from page* 170)

line of pumps of the Bingham Pump Co., Portland, Oreg., using patterns, tools and drawings developed by the Bingham organization.

° ° °

Velsicol Corp., Chicago, has opened an eastern sales and service headquarters at 9-11 Park Place, New York 7, in charge of J. Newton Hall. East central headquarters have been taken at 1900 Euclid Ave., Cleveland, with A. C. Conor as head of the sale of resins, insecticides and aromatic solvents in this territory.

° ° °

Sheboygan Gray Iron Foundry Corp., Sheboygan, Wis., has been incorporated by Leonard F. Wartman, Richard E. Kirchmayer, John R. Karpowitz and Wallace Rice, to operate a foundry and machine shop. Mr. Rice is attorney for the firm and is located at 735 North Water St., Milwaukee 2.

° ° °

Lakeside Aluminum Co., Menomonie, Wis., plans construction of a one-story brick foundry building, 50 x 90 ft. C. E. Porter is owner of the company.

° ° °

Alum-Alloy Casting Co., Racine, Wis., has been organized by George W. Bulin and Clarence M. Hansen, to operate a foundry and general machine shop.

° ° °

R. L. Brown, district sales representative for William F. Jobbins Inc., Aurora, Ill., has moved his office to 188 West Randolph St., Chicago 1, where he will handle sales of aluminum alloys.

° ° °

Accurate Foundry Mfg. Co. is the firm name under which Edward W. Vogel has published a certificate that he is conducting business at 1720 East 141st St., Los Angeles.

° ° °

Troyer Bros. Foundry, Superior Brass Foundry and the Elkhart Iron Works, all located on South Main St., Elkhart, Ind., were damaged by fire recently.

° ° °

Van Brunt Mfg. Co., Horicon, Wis., has let contract for a foundry addition 80 x 120 ft, to cost approximately $100,000.

° ° °

Permalite Casting Corp., 116 Main St., Muncie, Ind., has been incorporated to conduct a general foundry business, by William M. Nelson and Robert H. Bibler.

° ° °

United States Foundry Corp., Kalamazoo, Mich., is building a one-story gray iron foundry, 90 x 180 ft, and a core room 30 x 60 ft.

° ° °

Galva Heater Co., Galva, Ill., has been sold to the Gibbs Co., Delavan, Wis.

5 REASONS FOR CLEVELAND TRAMRAIL CORE-HANDLING EQUIPMENT

1 ELIMINATES REHANDLING — Delivers cores from coremaker to oven, thence to molding floor, via overhead tramrail route without rehandling.

2 CUTS COSTS — Saves time, speeds production, cuts costs. Coremakers spend more time making, less time handling cores.

3 REDUCES BREAKAGE — Easy operating carriers on smooth overhead track eliminate damaging vibrations and shocks. No chafing, cracking, or breaking of cores in transit.

4 NO REINFORCEMENT WIRES — Because of cushion-like handling with Cleveland Tramrail reinforcement wires can be eliminated for many cores. (Removing core wires sometimes costs more than cores themselves.)

5 WITHSTANDS OVEN TEMPERATURES — Cleveland Tramrail carriers are designed for usual oven temperatures up to 450 degrees F. No "sticky" wheel bearings.

Cleveland Tramrail core-handling equipment is inexpensive. It is easy to install in present plants. It is ideal for use through continuous baking ovens.

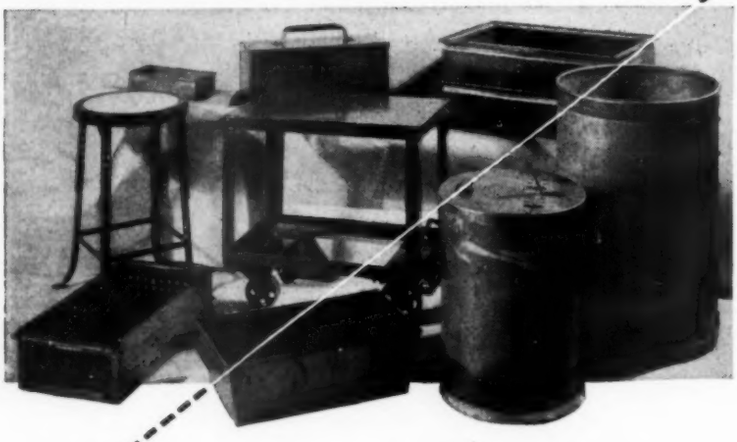
Now is the time to consider establishing real efficiency in your core department. Have an experienced Cleveland Tramrail sales engineer offer you recommendations — no obligation, of course.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1157 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

SHOP BOXES and BARRELS



the INFANTRY of

of Materials Handling!

Wherever small parts or products are made, processed, or assembled, the right kind of metal shop containers are as indispensable to more efficient handling as is G.I. Joe to the success of the Armed Forces. Because their importance is so frequently overlooked, better shop containers, made to fit your products, your machines, or conveying equipment, may prove more profitable than any similar small investment you could make.

Cleveland shop barrels are built to stand up in the hardest service. A full line of stock sizes are offered, as well as special types and sizes built to fit individual needs.

Catalog, just published, contains many worthwhile new and old ideas on small materials handling, as well as on steel shop equipment, such as piling boxes, nesting boxes, stools, cans, bins, and shelving. Ask for it.

STEEL FACTORY EQUIPMENT DIVISION

Cleveland Wire Spring Co.

2012 WEST 25th STREET • CLEVELAND 13, OHIO

Cleveland

STEEL SHOP EQUIPMENT

STOCK STYLES FOR GENERAL UTILITY

BUILT-TO-ORDER to meet special requirements

WEATHER AFFECTS CHILL DEPTH

(*Continued from page* 109)

the subject in question.

We also considered the fact known to most foundrymen in the light section casting field that in extreme cases of slow melting (decreased hourly capacity) both chill and fluidity decrease and kish, misruns, shrinks, and hardness appear at the same time in castings of varying sections and design. This occurrence is favored by excessive exposure of the iron charges to heat and incandescent coke, with consequently greater saturation of the molten metal with carbon and, therefore, of greater sluggishness.

Since we made arrangements in the direction of extended exposure to heat and coke (see Fig. 5, curves for "Weight of Charges" and "Charging Coke") and neither chill nor fluidity decreased and none of the aforementioned defects appeared in larger numbers than usually experienced in our production, we further concluded: That the steaming of ice from the charges, during the short descent to the melting zone, consumed sufficient time to prevent increased saturation with carbon, resulting sluggishness, and diminishing chilling effect. With the passing of the severe winter weather the excessive chilling effect on our various iron mixtures disappeared immediately.

Trouble Caused By Ice

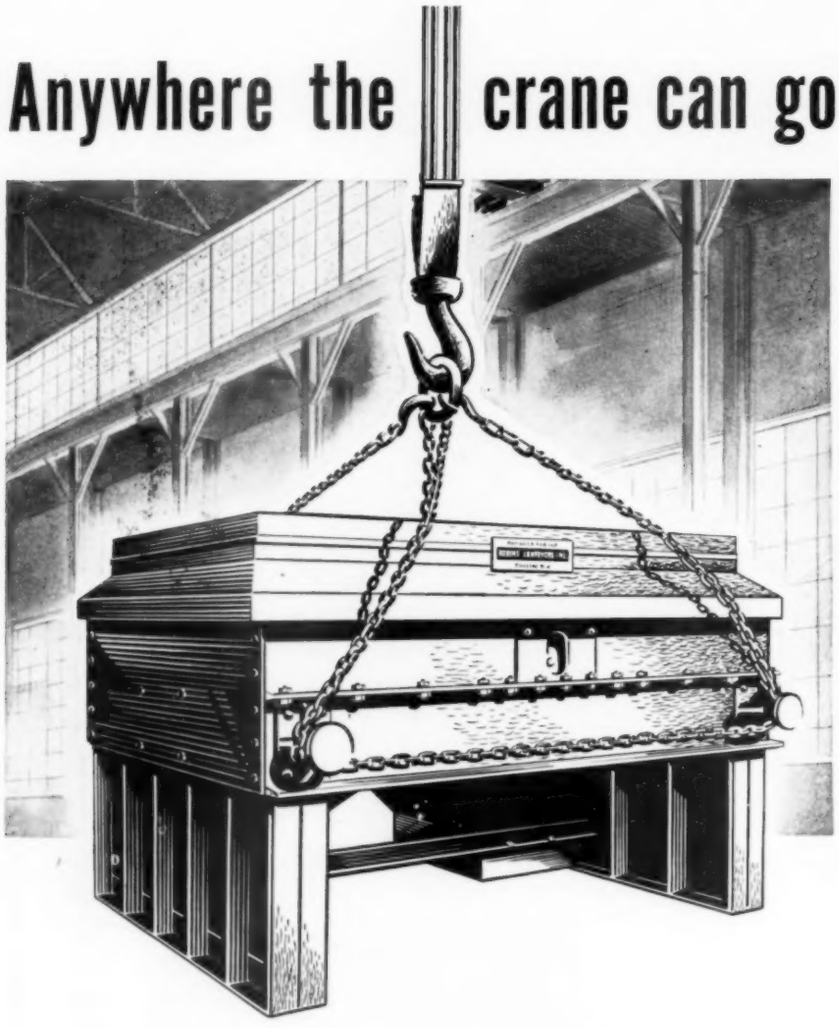
Not until May, 1945, did we decide to verify our conclusions. We contacted the local weather bureau, requesting information on snowfall, outside temperatures and other data for the period concerning our case. Proof that ice on our raw materials was the cause for the excessive chilling effect on our iron is furnished by Fig. 1. A comparison of the curves for "Depth of Chill," "Snowfall" and "Outside Temperatures" and their relations to each other during the periods of Nov. 27 to Dec. 11, and Dec. 12 to Dec. 30, 1944, clearly indicates that negligible snowfall at above freezing temperatures kept the chilling effect within natural limits, while the crust of ice (resulting from excessive snowfall at simultaneously decreasing outside temperatures) caused the chill to become considerably deeper. The fluidity during both periods changed very little and in no proportion to the other elements in Fig. 1.

Proof that lack of time for the steaming of ice in the short cupola stack, rather

(*Concluded on page* 176)

WHY ELECTRO-Silvery?
Keokuk Electro Silvery (high silicon pig iron) is manufactured under complete and constant control . . . assuring highest uniform quality. Available in standard and alloy . . . 30-lb. and 60-lb. pigs . . . 12 1/2-lb. piglets that can be charged by count. All can be handled by magnet. Ask about them today!
KEOKUK ELECTRO-METALS CO.
Keokuk, Iowa
For 30 Years . . . Electro-Silvery and Other Ferro-Alloys
Sole Agents: MILLER AND COMPANY
332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower
Cincinnati 2, Ohio
407 Eighth St.
St. Louis 1, Mo.

Anywhere the crane can go



Robins Portable Floatex Shakeouts are Job-Engineered to save manhours, save flask damage, and eliminate unnecessary labor. Whether your foundry is large or small, you will want to take advantage of the economy and efficiency of the Portable Floatex . . . Anywhere a crane can go, the Portable Floatex can go. And the Portable models have, in addition, all the features and advantages you have come to expect of all Robins Shakeouts . . . To learn how Floatex can contribute to *your* foundry operation, why not write to Robins for the Job-Engineered Floatex answer to your problems. A note or telephone call will, without obligation, bring a fully qualified Job-Engineer to your desk.

Robins Floatex Shakeouts are made in Portable models for loaded flasks weighing up to 17 tons; in other models, up to 100 tons or more—non-discharging and self-discharging types; with and without flask loaders.

ROBINS
CONVEYORS INCORPORATED
PASSAIC, NEW JERSEY
Division of Hewitt Rubber Corporation

AMERICA'S ONLY COMPLETE MATERIALS HANDLING SERVICE
Hewitt and Robins unite to offer you 136 years of combined experience in Job-Engineered rubber products and machinery for every materials handling problem.

(*Concluded from page* 174)

than inefficient cupola operation, prevented the iron from superheating itself enough to keep the chilling effect within normal limits, is furnished by the curves and their relations to each other in Fig. 5. Elimination of analysis seems justified, as no relation to the other curves could be established and the variations from Nov. 27 to Dec. 30, 1944, remained well within accepted limits as follows: TC plus or minus 0.12 per cent, not over 3.70 per cent; CC plus or minus 1.10 per cent, not over 0.62 per cent; Si plus or minus 0.07 per cent, not over 2.54 per cent; P plus or minus 0.05 per cent, not over 0.34 per cent; Mn max 0.65 per cent, and S-0.065 per cent.

Note that with more charging coke and smaller iron charges the chill steadily increased while usually under such conditions the opposite could have been expected. Greater proportion of remelt in the mixture and extended preheating time also failed to accomplish this end, though more charging coke and smaller iron charges were used at the same time.

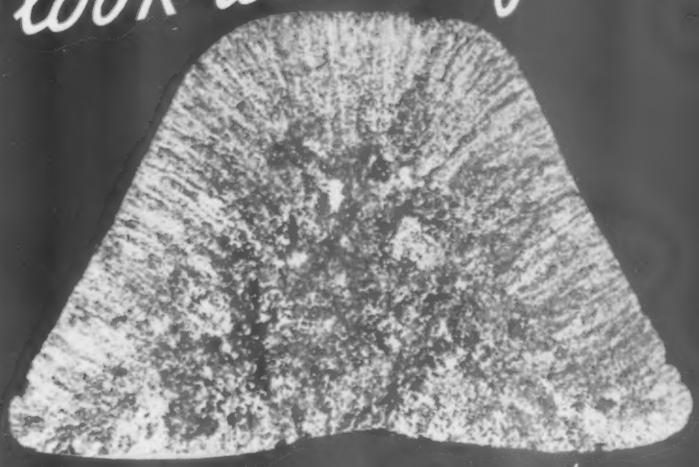
The fluidity, except for outside temperatures above freezing point (period 1), did not change in accordance with the altered provisions for higher temperatures and greater superheating. In fact, since more coke and less iron per charge was used during periods 2, 3, and 4 and no kish, shrinks, etc., appeared in the castings, it can only be deduced that the chilling effect on iron (besides other causes) is very much dependent on the time which the iron charges are allowed to remain in the cupola.

To Study the Heat Resistant Alloys

Under sponsorship of the Navy Office of Research and Inventions a program of research on the fundamental knowledge of the "why" of heat resistant alloys for gas turbine and jet propelled planes will be conducted at Battelle Memorial Institute, Columbus, O. Technologists of the institute will attempt to put knowledge of high temperature materials on a scientific basis in the hope that it will lead to the ability to predict even superior compositions. Analogous studies will be conducted on high temperature ceramic materials and metal-ceramic combinations as well as the collection of engineering and welding data pertinent to application of high temperature materials to gas turbine and jet propulsion service.

John E. Savage plans construction of a new foundry building at 733 North Victory Blvd., Burbank, Calif., 31 x 40 ft to cost $3000.

Let's look at the facts!



▲ **Typical Fracture of Jisco Silvery Pig Iron Containing 9% Silicon**

JISCO SILVERY PIG IRON

·HIGH SILICON IRON·
JISCO

1. Is a Blast Furnace Product
2. Is solid Pig Iron with a High Silicon Content.
3. Contains No Foreign Matter
4. Is made from Lake Superior Ores.
5. Is Physically and Chemically Clean.

General Andrew Jackson to his men, at the beginning of the campaign against the Creek Indians. "Yes soldiers, the order for a charge will be the signal for victory. In the moment of action, coolness and deliberation must be regarded; your fires made with precision and aim. You must proceed to the assault with quick and firm step, without trepidation or alarm."

JISCO IN YOUR CHARGE *means*

Quality in Your Castings

CONSULT OUR METALLURGICAL DEPARTMENT

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO.

Activities of foundry GROUPS

Western New York

REGULAR monthly meeting of the Western New York Chapter of the AFA, was held at the Hotel Touraine, Buffalo, Dec. 7, with 102 members and guests in attendance. After the dinner, Chapter Chairman Arthur H. Suckow introduced J. A. Gitzen, Delta Oil Products Co., Milwaukee, the guest speaker.

Mr. Gitzen covered in an interesting and thorough manner the subject of core binders and washes. Beginning with an outline of the history and development of the various types of core binders, such as those derived from cereals, paper mill by-products and petroleum, he brought out the advantages and disadvantages of the different binders and the purposes for which they are used. He discussed the development of modern blended core oils which are better for general foundry use than anything which has yet been found, as well as inorganic materials such as clay, silica flour and bentonite, used to make cores strong at high temperatures and to provide good green strength.

The speaker stressed the importance of careful supervision in the mixing of core sand. In spite of all the care used in selection of materials, defective cores too often result from careless mixing of the sand. Another cause for complaint is under-baking of the cores. The baking operation should thoroughly oxidize the binder. In this connection, Mr. Gitzen advised the group of a fast-baking process which has been developed to bake certain cores in a matter of minutes instead of hours, by pulling the hot air through the cores and thus speeding up oxidation of the binder.

On the subject of core washes, the speaker pointed out that a good core wash should be highly refractory, have high hot strength and should seal the surface of the core so that the gas is forced to pass out through the vents or the backing sand of the mold. Interest in the subject was indicated by the lively question and answer discussion which followed the talk.—*Leo A. Merryman, secretary.*

Eastern Canada and Newfoundland

DECEMBER meeting of the Eastern Canada and Newfoundland Chapter of the AFA took the form of a Christmas dinner dance, held in the Jacques Cartier ballroom of the Mount Royal Hotel, Montreal. Last year the chapter inaugurated a policy of entertaining the ladies once a year, at Christmas, this year's function was bigger and better than our first Ladies' Night.

An excellent turkey dinner opened the evening, followed by a highly entertaining floor show, under the direction of Miss Betty Speirs. The balance of the evening was spent dancing to the music of Al McGowan's orchestra. Ewing Tait, chapter chairman, presided during the evening and introduced the guests, including J. Sully of Toronto, national director of the AFA, C. K. Lockwood, chairman of the Montreal Chapter of the American Society for Metals, T. F. Donald, president of the Canadian Railway Club, and Robert Bernard, past chairman of the chapter.

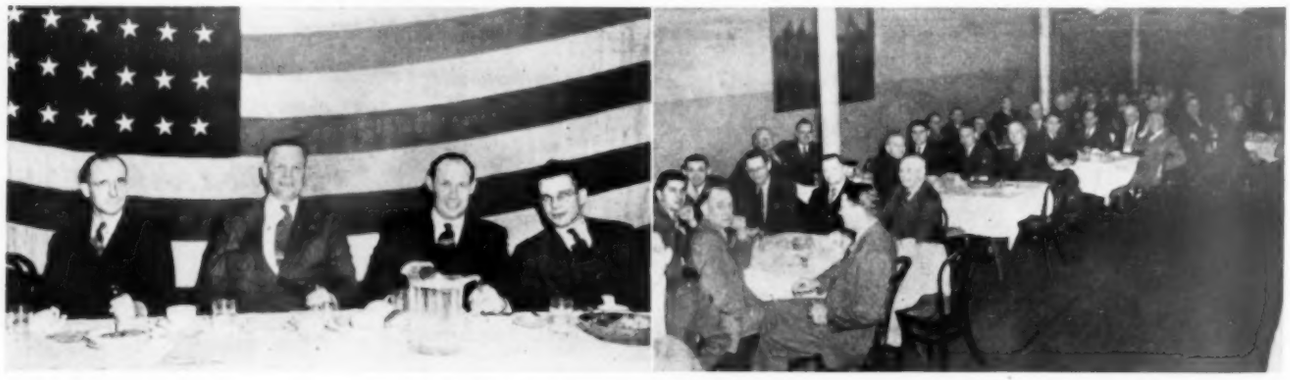
Thanks of all in attendance are due to the entertainment committee, under the direction of James Newman, for providing them with such an entertaining evening.—*G. D. Turnbull, publicity chairman.*

Philadelphia

DEC. 7 meeting of the Philadelphia Chapter of the AFA, held at the Engineers' Club, was attended by about 150 members and guests. John Robb, chapter chairman, presided.

W. J. Diederichs, metallurgist, Autocar Co., was technical chairman and presented R. B. Fisher, who gave a paper by B. F. Shepard, chief metallurgist for Ingersoll-Rand, Phillipsburg, N. J., entitled "Cast Iron—A New Engineering Material." Mr. Shepard was in Europe and was unable to give the paper as scheduled. Mr. Fisher did an excellent job of presentation. His remarks covered several phases of cast iron production control. Stressing the possibilities of high tensile cast iron, where it can be depended upon from casting to casting and day to day, he pointed out that strength can be a suitable substitute in many engineering applications for ductility. In such applications the engineer would consider the use of nonductile metals provided they could be relied upon for consistently high strength values.

(*Continued on page* 180)



INDIANAPOLIS: Recent meeting of the Central Indiana Chapter, AFA, resulted in these views of the speaker's table and the general gathering. Seated at the table, left to right, are: J. P. Lentz, International Harvester Co., chapter vice chairman; Ray S. Davis, National Malleable & Steel Castings Co., chapter chairman; A. C. Den Breejen, Hydro-Blast Corp., Chicago, the principal speaker, and Joseph A. Barrett, National Malleable & Steel Castings Co. (Photos courtesy B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis)

IT'S NOT CHILD'S PLAY

Team up with MOGUL and KORDEK
— you can depend on them.

KORDEK

KODEK is a perfect DRY BOND which can be used in smaller quantities than most dry binders. KORDEK produces better castings with fewer discards.

TURNING out money-making castings is not child's play. It's man's work . . . and it takes skill and experience and "know-how".

Most foundry men use and value MOGUL and KORDEK because they have fewer discards, hence more profitable production.

MOGUL is a perfect Green Bond, which increases permeability in cores. Use MOGUL in cores for both green and dry strength.

MOGUL works with core oil; it decreases drying time and yields smooth cores. MOGUL works perfectly with pitch or resin, too, because cores can be handled while still warm. MOGUL is widely used with sharp sands.

CORN PRODUCTS SALES CO. **17 BATTERY PLACE NEW YORK 4, N. Y.**

(*Continued from page* 178)

Mr. Fisher emphasized the need for foundry control to assure the engineer of the possible uniformity of high tensile irons. He touched on proper analytical methods for carbon determination, use of alloys, potentialities of heat treatments usually given only to steels and illustrated a most interesting story on gating practice with a movie which showed the action of molten metal in various gating arrangements. He pointed out the inconsistencies of foundry gating practice with well established fundamental hydraulic principles.—*E. C. Troy, publicity chairman.*

DETROIT REUNION: Scenes on the occasion of the first Officers and Directors Reunion of the Detroit Chapter, AFA. More than 30 former and current officials of the group attended. Shown in the top panel, left to right, are: A. T. Waterfall, L. G. Korte, unidentified guest, Terry Boland, Vaughan Reid. Second panel: Howard McCoy, Bill Muhlitner, Fred Walls, Harry Dietert. Third panel: Art Stolzenburg, Art Allen, Ed Hoenicke, George Fuller, Jim Mahon. Fourth panel: Terry Boland, Vaughan Reid, Art Stolzenburg, Earl Morrison, R. G. McElwee, W. B. McFerrin, H. H. Wilder, Gil Galmish. (Photos courtesy C. E. Silver, Michigan Steel Casting Co., Detroit)

Ontario

ONTARIO Chapter of the AFA held its second group meeting of the season at the Royal Connaught Hotel, Hamilton, on Nov. 23. The dinner meeting, under the chairmanship of T. D. Barnes, Don Barnes Foundry Supplies & Equipment, was followed by group meetings of the steel, nonferrous, gray iron, and malleable sections.

The steel meeting, under the chairmanship of Alex. Wilson, Fahralloy, Canada, Ltd., was on the subject "Water Quenching of Steel Castings."

C. W. Farrar, Fahralloy, Canada Ltd. gave a brief outline of the history of water quenching from its commercial inception about 37 years ago, and also discussed some of the effects of this treatment upon the properties of steel castings.

The second speaker, W. E. Loosley, Dominion Foundries & Steel Ltd., discussed "Heat Treatment of Steel Castings," with particular reference to the types of furnaces and heating cycles employed.

L. F. Train, John Bertram & Sons Co. Ltd., Dundas, spoke on "Water Quenching in Relation to Design." He brought out the point that if a casting was properly designed for efficient production in the foundry, it was suitably designed for water quenching. Certain applications, where steel castings would be preferred to forgings if the manufacturer could rely on them being solid throughout, were mentioned.

In the nonferrous group, under the chairmanship of D. M. Loucks, St. Thomas Bronze Co. Ltd., Harold J. Roast, Canadian Bronze Co. Ltd., spoke on "Some Special Casting Problems." Mr. Roast had a number of exhibits, particularly of castings which had been made centrifugally.

The speaker described briefly the practice followed in making a number of centrifugal castings including gear blanks, a secret device, and other items. He also outlined a simplified heat treatment which was adopted on sealing collars of an alloy containing 85 per cent copper and 10 per cent aluminum. Instead of heating, quenching and drawing as originally proposed, castings were poured at 2000 F into green sand and were knocked out of the sand at the earliest possible moment after they had become solid.

(*Continued on page* 182)

YOUR PURCHASING PROBLEM

WILL BE

Simplified!

— IF YOU BUY FEDERATED

ALUMINUM BRONZE INGOT
ALUMINUM ALLOYS
ALUMINUM SHOT
ALUMINUM HARDENERS
ALUMINUM SOLDER
ANTI-FRICTION METAL
ANTIMONY
ANTIMONIAL LEAD
ARSENICAL COPPER
BABBITT
"G" BABBITT
"S" BABBITT
BEARING ALLOYS
BODYRITE SOLDER
BRASS AND BRONZE ALLOY INGOTS
"CT" METAL
COPPER ANODES
COPPER INGOTS
COPPER NICKEL SHOT
COPPER SHOT
DEOXIDIZERS (Metallic)
DIE CASTING METALS
  Aluminum—Zinc and Lead Base
GALVOBRITE
  For Zinc Galvanizers
HERCULOY INGOT
  (Silicon Bronze)
LEAD
  Pigs and Ingots
  Caulking
MAGNESIUM ALLOYS
MANGANESE BRONZE INGOT
MANGANESE COPPER
  Shot and Slab
NICKEL SILVER INGOT
PHOSPHOR TIN
SILICON BRONZE
SILICON COPPER
  Shot and Slab
SILVER-LEAD SOLDER
SOLDER (Extruded and Cast)
  Pigs, Bars and Ingots
  Wire
  Ribbon
  Acid Core
  Rosin Core
"ST" SOLDER ALLOYS
SPECIAL ALLOYS
TERNE METAL
TIN
  Pigs, Bars, Ingots
  Wire and Ribbon
TIN PIPE
TYPE METALS
  Linotype
  Stereotype
  Electrotype
  Monotype
ZINC
  Slabs, Ingots, and Anodes
ZINC DUST
ZINC ALUMINUM ALLOYS

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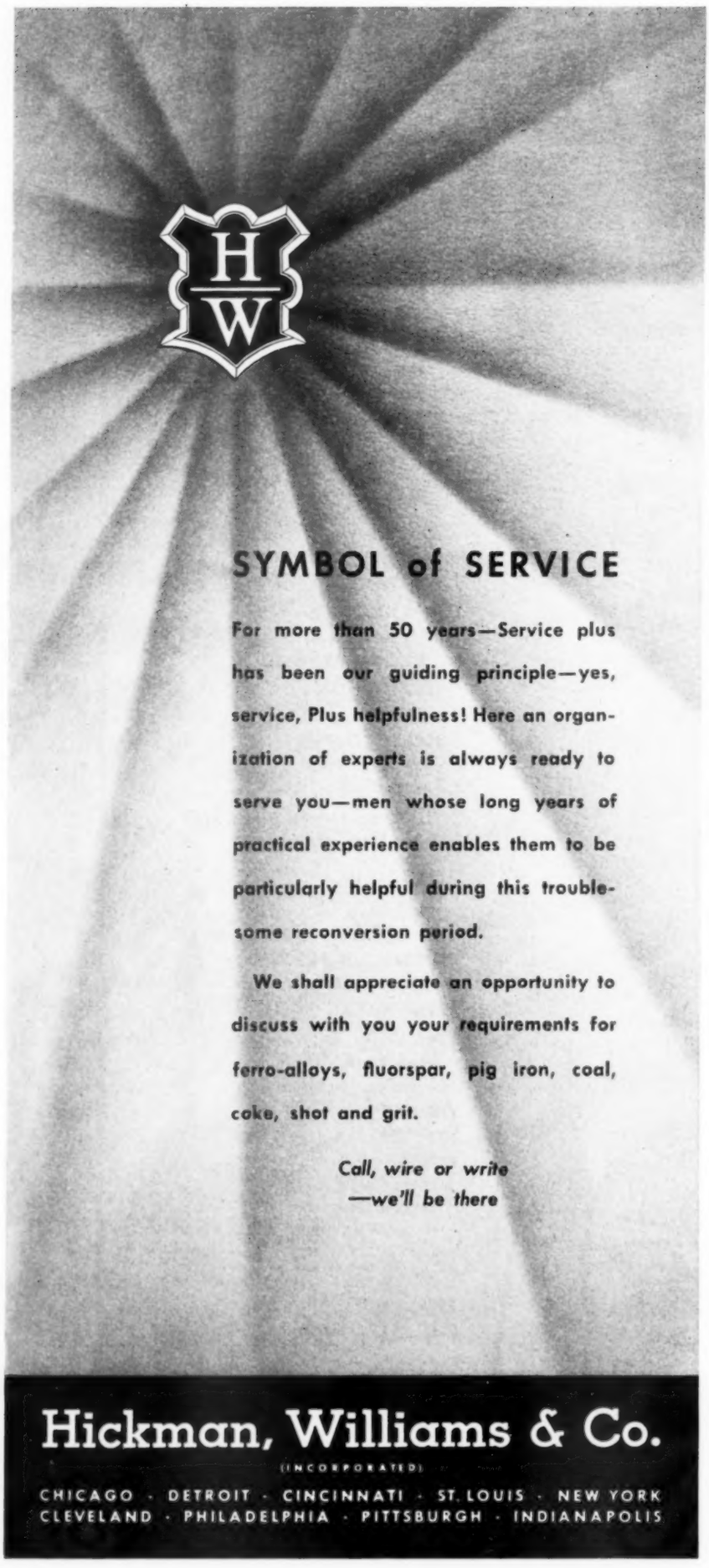
METALS DIVISION
FMD
AMERICAN SMELTING
and REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
Nation-wide service with offices in principal cities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W
SYMBOL of SERVICE
For more than 50 years—Service plus has been our guiding principle—yes, service, Plus helpfulness! Here an organization of experts is always ready to serve you—men whose long years of practical experience enables them to be particularly helpful during this troublesome reconversion period.
We shall appreciate an opportunity to discuss with you your requirements for ferro-alloys, fluorspar, pig iron, coal, coke, shot and grit.
Call, wire or write
—we'll be there
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CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

(*Continued from page* 180

Excess sand was scraped off in order to hasten cooling, and the castings given this simple heat treatment passed specifications with plenty of margin.

In the gray iron group, under the chairmanship of Wm. Prosse, Cockshutt Plow Co. Ltd., the speaker was G. J. Gaukroger, McKinnon Industries Ltd., who led the discussion along lines of cupola and sand practice. The speaker stressed the need of accurate weighing of cupola material in order to keep the metal within chemical specification, and also to know proper melting costs. Where scales are used for weighing the charges, special equipment can be obtained which will record on tape the weights of the different melting materials. Totals can be computed at the end of the day.

At the malleable group, Charles Thompson, Galt Malleable Iron Co. Ltd., was chairman and the discussion leaders were J. J. McFadyen, Galt Malleable Iron Co., and A. Graham, Galt Testing Laboratories, with the subject "Some Observations on Shrinkage Cracks and Hot Tears in Mallable Iron."—*G. L. White, secretary.*

Northern California

NORTHERN California Chapter of the AFA, held its Dec. 10 meeting at the Engineers' Club, San Francisco, with James E. Glidewell, assistant chief engineer, Hall Scott Motor Car Co., Berkeley, Calif., as guest speaker. Mr. Glidewell was introduced by Andrew M. Ondreyco, program chairman. The announced subject of his address was "Casting Design and Selection of Materials," which the speaker stated could better be described as an answer to the foundrymen's query, "Why do you design those screwy castings?"

The answer, according to Mr. Glidewell, is simple. To design a truck engine, all that has to be done is to take limitations in size, such as a maximum width of 28-in., limitations in weight of 76,000 lb gross, and the horsepower desired, and then figure on the size bore, crankshaft, piston, bearing area, etc. With this in mind castings can be designed with sufficient strength and with enough bosses to tie the engine together and with enough pads to hang on all the pumps, generators, cleaners, etc., that a modern engine demands. The result, more than likely, is a bunch of "screwy castings," but the engine delivers the desired performance.

The talk was followed by slides and questions, with the speaker himself stumping the audience with the question, "Why is it, when discussing a drawing, a patternmaker always turns the darned thing upside down?" He also

(*Continued on page* 184)

YOUR DUST PROBLEM CAN BE SOLVED BY SLY

Economically Promptly Conveniently

SLY ENGINEERS give you the answer for your conditions. Call a Sly engineer today.

He will cooperate with your staff in a study of all the factors vital to a successful dust control installation—plant layout—operating conditions—hoods—piping—ventilation—and the Sly Dust Filter to serve you best.

FOUNDRYMEN REALIZE 5 EXCLUSIVE ADVANTAGES IN SLY DUST FILTERS:

1. Greater filtering capacity because of more filtering cloth.
2. Taut bags (patented) save power and improve dust removal.
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4. Automatic control (any degree) minimizes or entirely removes the human factor.
5. Simpler shaker mechanism results in savings in maintenance and operation.

Ask for Bulletin 98 and tell us your problem so that we can write you fully.

THE W. W. SLY MFG. CO.
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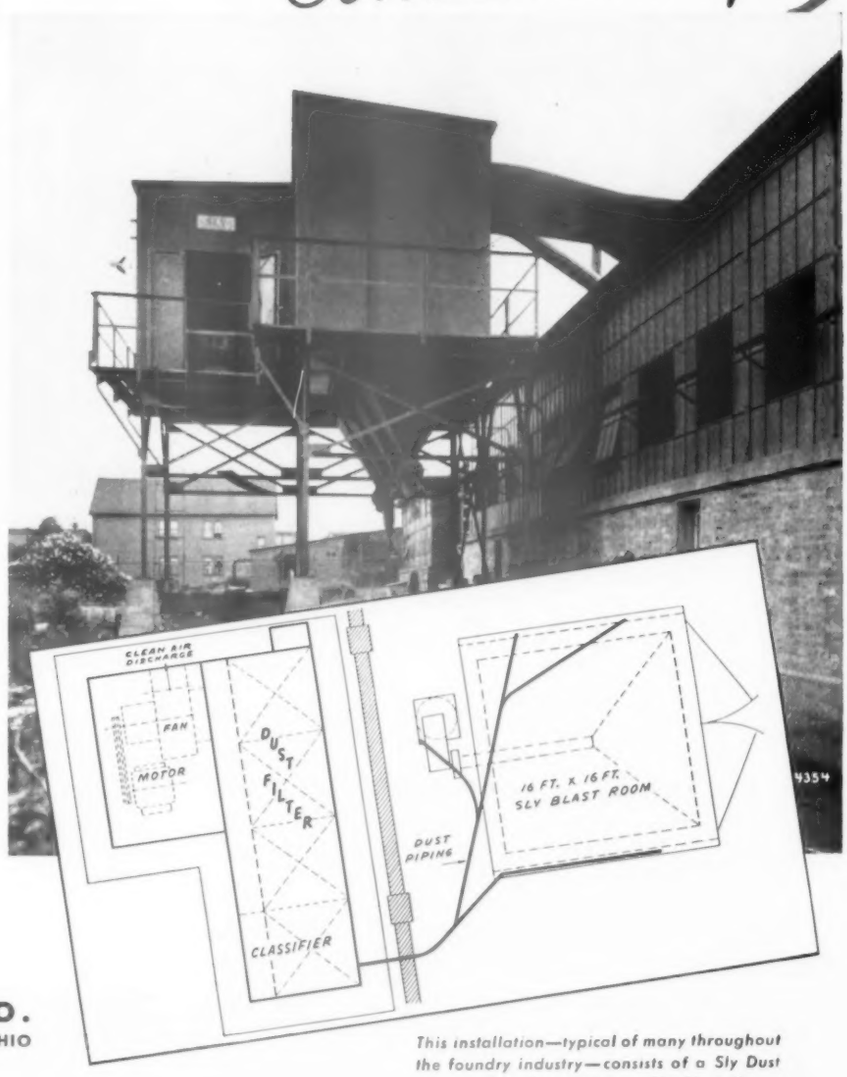

This installation—typical of many throughout the foundry industry—consists of a Sly Dust Filter exhausting a large Sly Blast Room.

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS BLAST CLEANING EQUIPMENT

FOR *Safety*
THAT MEETS EVERY TEST...
FOR *Comfort*
THAT EASES THE JOB!

The M·S·A *Abrasive Mask*

Officially Approved by the U. S. Bureau of Mines

Safety is the first consideration in foundry shot-and-sandblast protective equipment—comfort is a vital runner-up! Both demands are fully realized in the popular M.S.A. Abrasive Mask—tested and approved for protective efficiency, light in weight and easy to wear throughout the working period. Consisting of a durable hood which cushions the impact of abrasives, snug-fitting facepiece and connecting tube, flow control valve with "bump-proof" adjustment, quick release connection and optional air filter, web belt, and air hose with couplings, the M.S.A. Abrasive Mask is designed in every particular for heavy-duty service.

Write for complete details in Bulletin CS-18!

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PA.

(*Continued from page* 182)

announced that one of the engineers of his company had discovered the cause of the porosity which machinists occasionally unearth, namely, cast iron termites.

Chairman Charles Hoehn Jr. announced several new appointments in the chapter, as follows: J. F. Aicher, E. A. Wilcox Co., secretary; Jack K. Benedict, Donald Kenneth Co., treasurer; David B. Reeder, Electro Metallurgical Sales Corp., attendance chairman; George W. Stewart, Pacific Brass Foundry of San Francisco, sand committee chairman; and Charles R. Marshall, Chamberlain Co., publicity chairman.—*Charles R. Marshall, publicity chairman.*

Twin City

"FOUNDRYMEN of the Future" was the theme of the talk and discussion at the Twin City Chapter's November meeting. This meeting was National Officer's Night and President Fred Walls, Vice President S. V. Woods and Norman Hindle and Herbert Scobie from national headquarters attended. Mr. Hindle gave a brief summary of the work now being done to make the 1946 AFA convention a success and outlined the work that is being done on the Technical Development Program. He requested that members direct more inquiries to the Chicago office and invited members to visit it at any time to get acquainted with the organization and the work that is being done there.

The evening's discussion centered around the theme that the foundry is a good place to work and after foundrymen have convinced themselves of this fact, they must then convince the public and especially young people that there are a multitude of opportunities in the foundry.

Mr. Walls' discussion was accompanied by charts which he used to outline how the program of youth encouragement should be handled. Definite steps were mentioned, commencing with the attitudes of foundry management and then the use of outside publicity to attract young men to the industry, and finally improvements within shops to keep the new workers enthusiastic. He stated that methods must be adopted to eliminate the undesirable features of foundry work that have been so impressed on the mind of the public. Good housekeeping and improved ventilation are the first steps along this line, followed by increased mechanization to eliminate the heavy work, where possible, without mechanizing to such a degree that individuality or pride of accomplishment is eliminated.

Co-operation with schools should be inaugurated to help train men for the

(*Continued on page* 187)

Mr. Foundryman:

Check these 7 basic features of VELSICOL'S new light color CORESIN OILS

Check them well and consider why these new *light color oils* are superior from start to finish for your core making requirements.

- ✓ High, fast tensile strength.
- ✓ Longer retained strength than conventional type oils.
- ✓ Thorough baking with no over-baked cores.
- ✓ No burned edges to cores at normal core baking temperatures.
- ✓ Low percentage of gas evolution.
- ✓ High dollar value per ton of finished castings.
- ✓ All metals adaptability.

VELSICOL

VELSICOL in announcing the sensational improvement in color and performance in the new *light color* CORESIN OILS, calls attention to the contributions made by its scientific research in this field. In cooperation with engineering know-how Velsicol chemists in plant and laboratory determined that the selective cracking of petroleum hydrocarbons would yield resins imparting the improvements that underly these seven desirable characteristics. Their success may be judged by the product. Only VELSICOL CORESIN OILS among petroleum based oils are light in color, and possess all the above listed advantages.

Velsicol, as the source of these resins, produces them to specification that assures controlled uniformity for CORESIN OILS... And remember only Velsicol makes *light color*, petroleum hydrocarbon CORESIN OILS.

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Manufacturers of Coresin Core Oils · Aromatic Solvents · Synthetic Resins · Insect Toxicants

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It will help us to meet your specific needs for an adequate sample of VELSICOL CORESIN OIL if you will fill out the attached coupon.

CLIP THE COUPON

VELSICOL Corporation,
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Gentlemen:

Kindly send without obligation a test sample of VELSICOL CORESIN OIL to suit the following specifications:

(1) Our foundry pours _____ metal
(2) Baking time and temperature _____
(3) Type of sand and sand mix _____
(4) Oil-to-sand ratio _____
(5) Percent and type of cereal binder _____

Name _____
Company _____
City _____ State _____

The Foundries Materials Co. Midwest Foundry Supply Co.
COLDWATER & DETROIT, MICH. EDWARDSVILLE, ILL.

The Foundries Materials Co. H. S. Stoller & Co. W. Gray Hampton
HAMMOND, INDIANA AKRON, OHIO CHATTANOOGA, TENN.

There's a story behind **OVEN No. 27,733**

Which explains why so many leading foundries always specify

DESPATCH BATCH TYPE CORE-BAKING OVENS

As the 27,733rd consecutive oven built by Despatch, the typical batch type Core Baking Oven pictured here proves the extra value of *applying* 44 years of engineering experience in oven design and construction.

Installed at South Park Foundry & Mfg. Co. in South St. Paul, this Despatch oven bakes over 5 times more cores than were obtained with an older oven a year ago . . . and at 40% less cost than before. Other advantages have been equally spectacular.

PROMPT DELIVERY ASSURED

For fast, uniform baking in your foundry there are 64 standard models of Despatch Batch Type Ovens *available for prompt delivery*. Gas or oil fired; rack, drawer, car or truck types. *Wire or write for details.*

Write for new illustrated bulletins of Despatch Foundry Ovens.

BUILDERS OF ALL TYPES OF OVENS & FURNACES

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A few typical users of DESPATCH OVENS

Allegheny Ludlum Steel Corp.
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DESPATCH OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

FIELD ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

(*Continued from page* 184)

foundry, and shops should be opened to the public for inspection trips. All types of publicity should be carried on by pictures, talks and displays to emphasize the possibilities of the foundry industry. Professor Rawley, head of the Mechanical Engineering department, University of Minnesota, spoke on the work that the university is doing in foundry training. Representatives of the Minneapolis and St. Paul public schools stated that the schools were anxious to work with industry in establishing a permanent course in foundry training.—*J. W. Costello, reporter.*

Central Indiana

AT the Dec. 3 meeting of the Central Indiana Chapter of the AFA, A. C. Den Breejen, sand research technician, Hydro-Blast Corp., Chicago, presented an enlightening talk on "Foundry Sands." Mr. Den Breejen, who has had wide experience in this field and is a former instructor at the University of Minnesota, illustrated his talk with slides.

He discussed sand characteristics and the application of the simple, chemical test, using 5 per cent hydrochloric acid for the determination of limestone in sand, and called attention to the simple aids available but not now being used in the foundry. Joseph A. Barrett served as chairman of the meeting and directed the channels of discussion.—*B. P. Mulcahy, historian.*

Southern California

ANNUAL Christmas party of the Southern California Chapter of the AFA was held at Lakewood Country Club, Los Angeles, with over 300 members and guests present for the splendid dinner which the club provided. Earl Shomaker, chairman of the entertainment committee, and its members, put on a fine entertainment, making the party a great success as well as an introduction to a gay holiday spirit.—*James B. Morey, publicity chairman.*

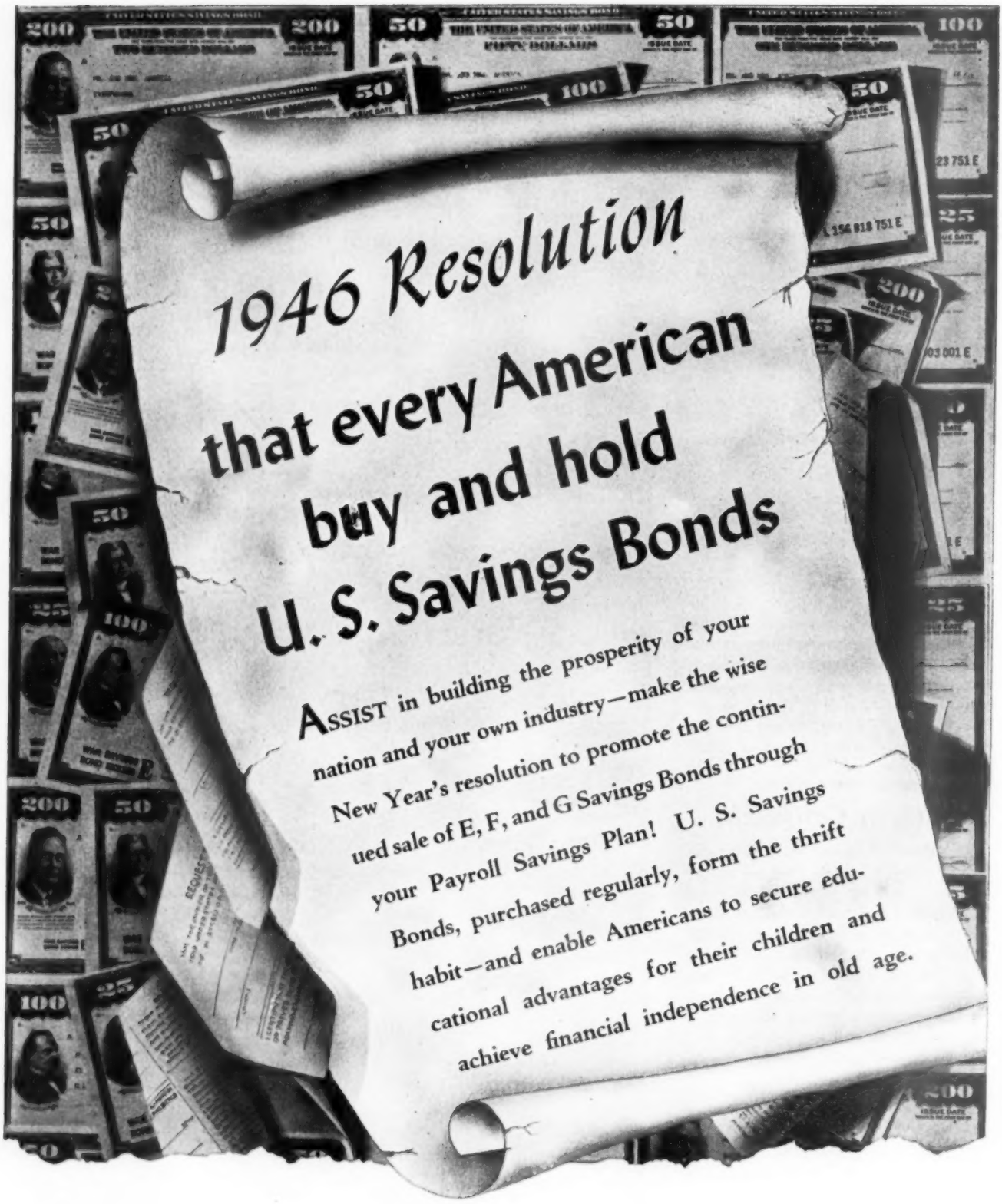
Central Ohio

EARL E. Woodliff, Foundry Sand Engineering Co., Detroit, addressed the Central Ohio Chapter of the AFA, Dec. 17, at Columbus on the subject, "An Engineer Looks at Sands and Binders." Despite the prevalence of flu and extremely cold weather, there was a good turnout to consider the always interesting subject of sand.

Mr. Woodliff first discussed the engineering aspects of sand, explaining its physical properties, such as size, shape

(*Continued on page* 189)

SOUTHERN CALIFORNIA CHAPTER
AMERICAN FOUNDRYMEN'S ASS'N.
NINTH XMAS STAG DEC. 8 1945
LAKEWOOD COUNTRY CLUB-LONG BEACH CALIF.


1946 Resolution
that every American
buy and hold
U. S. Savings Bonds
ASSIST in building the prosperity of your nation and your own industry—make the wise New Year's resolution to promote the continued sale of E, F, and G Savings Bonds through your Payroll Savings Plan! U. S. Savings Bonds, purchased regularly, form the thrift habit—and enable Americans to secure educational advantages for their children and achieve financial independence in old age.

The Treasury Department acknowledges with appreciation the publication of this message by

THE FOUNDRY

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(*Continued from page* 187)

and surface, and physical reactions to mechanical breakdown and expansion. He then dealt with the specific properties of all types of binding materials and auxilliary agents which are added to sand. Values of the materials were clearly illustrated by three charts which indicated the properties over a wide range in temperature.

An important point made by Mr. Woodliff was that while many foundries do sand testing, few of them study and use the results so as to have effective sand controls.—*M. B. Millar.*

New England

ABOUT 100 members and guests of the New England Foundrymen's Association attended the regular monthly meeting Dec. 12 at the Engineers' Club, Boston. Since this was the final meeting of the year a nominating committee, consisting of R. F. Harrington, Hunt Spiller Mfg. Corp., Boston, Ray Meader, Whitin Machine Works, Whitinsville, Mass., and Walter M. Saunders Jr., Walter M. Saunders Co., Providence, R. I., was appointed to select a slate of officers to be voted on for the coming year. President Hosmer announced that the association would celebrate its 50th anniversary at the annual meeting to be held at Hotel Gardiner, Jan. 9, for which a special program has been arranged.

Edward E. Kuypers, personnel director, First National Stores Inc., Somerville, Mass., spoke on "Understanding Management-Labor Problems." This was a follow-up talk on the subject of "Personnel Relations in the Coming Postwar Period," which he gave a year ago. Mr. Kuypers has lectured for many years on industrial relation problems and has become an outstanding speaker on personnel work. He stated that although we enjoy more privileges in this country than in any other, it was his earnest desire that we continue to do so in the future, although it is difficult under present conditions to maintain our way of life. We cannot have larger pay envelopes without greater production efforts.

The speaker explained that the general idea of the union man is to obtain a more equal distribution of wealth. Industry, in putting money to work, assures a better standard of living for all. The amount of money a worker receives, no matter how great, is of no benefit to him unless he can buy for himself a better standard of living. The paramount question is whether or not we have reached our maximum standard of living or whether we can still reach a higher one. We must, to keep from losing our great privileges, go back to free enterprise

(*Continued on page* 191)

There's a

SCHRAMM

AIR COMPRESSOR

. . . for your every need!

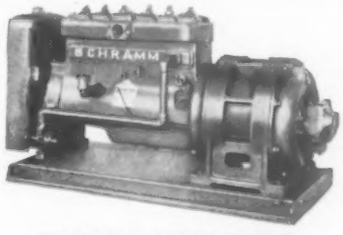
SIZES RANGING FROM 2 TO 600 CU. FT. DISPLACEMENT

DIRECT DRIVE ON BASE

Built-in Motor Drive mounted on steel base is compact and easy to install. No foundations necessary.

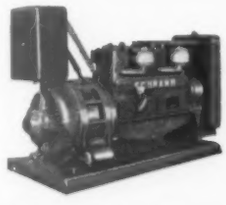
WITH "V" GROOVE PULLEY

Schramm Belt Driven Compressors can be obtained with "V" or flat belt drive suitable for twenty-four hour service and economical operation.



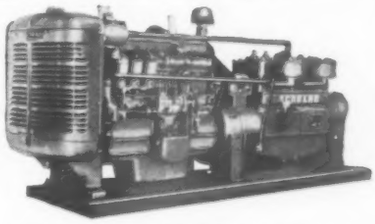
DIRECT MOTOR DRIVE WITH COOLING UNIT

Schramm 300 cu. ft. displacement with direct-connected 50 H.P. motor with cooling unit on Steel Deck Base.



DIRECT DRIVE WITH STARTER AND RADIATOR

Both compressor and motor are mounted as a single unit on a substantial steel base with starter, radiator, and cooling unit.



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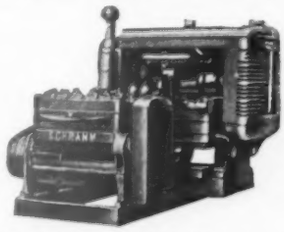
Complete self-aligned, direct connected Diesel Engine Driven Compressor for semi-portable or stationary installation.



BELT DRIVE ON BASE WITH ENGINE

Schramm Engine Belt Drive on Base combinations are available for applications not reached by electric power service in mill, mine, and other industrial plants.

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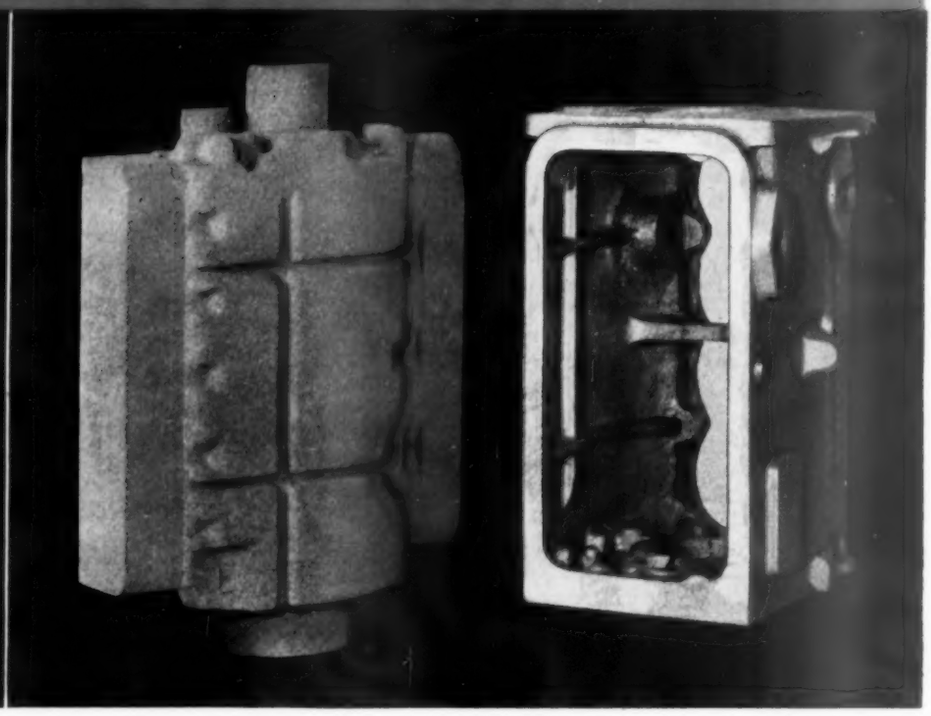
(LIGHT WEIGHT) (HEAVY WEIGHT)

CEREAL BINDERS

Make Cores Collapse Faster

A small percentage added to your mix will:

- Bring out fine detail
- Give smooth performance in core boxes
- Supply proper green bond to sharp sand
- Reduce core and cleaning costs



PARAPHRASING that old saying that "the proof of the pudding is in the eating," the illustration above shows the value of cores made with Krause Cereal Binder. At the left is a half section of a core for a gray iron housing. At the right is the finished casting. Notice the detail . . . the smoothness of surface . . . the elimination of surface finishing.

Made to the most exacting standards, Truscor and Amerikor are of unvarying quality . . . provide greater binding strength in the green and dry core stages . . . have increased permeability . . . stick less . . . ram easier . . . and give you increased production of better cores.

For better cores at lower cost, with fewer rejects, specify Truscor or Amerikor on your next order for cereal binder.

CHAS. A. KRAUSE MILLING CO., Milwaukee 1, Wis. • *World's Largest Millers of Dry Corn*

'PHONE, WIRE OR WRITE OUTLINING YOUR CORE PROBLEM IN DETAIL.

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Frederic B. Stevens, Inc., Cleveland 14, Ohio
Frederic B. Stevens, Inc., Detroit 26, Mich.

(*Continued from page* 189)

and a capitalistic form of government. Management has learned a great deal about better treatment of workers but must practice what it has learned. If management will take more interest in the welfare of the worker than union leaders are now doing, the confidence of the worker will be regained and living standards will be raised. Mr. Kuypers was kept busy after the address, answering questions for some time—*Merton A. Hosmer, president.*

Connecticut

MONTHLY meeting of the Connecticut Nonferrous Foundrymen's Association was held Dec. 19 at the Hotel Taft, in New Haven. The evening was spent in a roundtable discussion of various problems and in planning for various technical meetings throughout the coming year.

Annual election of officers was held at the meeting and includes the following: President, S. W. Chappell Sr., Electric Boat Co., Groton, Conn.; vice president, Joseph Shannon, Jenkins Bros. Co., Bridgeport, Conn.; treasurer, George S. King, Malleable Iron Fittings Co., Branford, Conn.; secretary, Louis G. Tarantino, 166 Cold Spring St., New Haven, Conn.; technical secretary, Frank D. Diana, Whipple & Choate Co., Bridgeport, Conn.

Members of the executive committee are: Walter J. Kenney, North & Judd Co., New Britain, Conn.; Ernest F. Stone, Manning, Maxwell & Moore Inc., Bridgeport, Conn.; D. Wesley Case, Belknap Mfg. Co., Bridgeport, Conn.; Howard A. Phelps, Knapp Foundry Co., Guilford, Conn., and T. Joseph Judge, Jenkins Bros. Co., Bridgeport, Conn.

The meeting scheduled for Feb. 20 will have as its technical subject, "Recommended Practices in the Use of Crucibles," and the speaker is to be furnished by the Joseph Dixon Crucible Co., Jersey City, N. J. — *Louis G. Tarantino, secretary.*

Toledo

SPEAKING before the Toledo Chapter of the AFA on Dec. 21, Steven Garry, general coreroom foreman, Caterpillar Tractor Co., Peoria, Ill., chose as his subject, "An Engineer of Human Relations." Placing the full responsibility for agreeable labor conditions on the supervisors' shoulders, as direct representatives of top management, Mr. Garry highly recommended the conference type of training course for supervisors. It is management's job to mold the supervisor into "an engineer of human relations."

(*Continued on page* 194)

• Picking up a load and placing it on the exact right spot is only as efficient as the crane that lifts and carries and lowers its cargo.

Balanced drive gears with automatic oil bath lubrication—permanent alignment—anti-friction bearings—give Shepard Niles cranes precision control operation and more dependability under constant load handling. Shepard Niles cranes are designed and built for tough, long service with a thorough knowledge of the performance expected of them.

* * *

Our staff of engineers are ready today to help you to plan a better, more economical handling system. Write them.

For smooth, constant, dependable lifting and handling, select a Shepard Niles hoist. The completeness of the Shepard Niles line of electric hoists permits the selection of the most efficient lifting and load-moving equipment for any requirement.

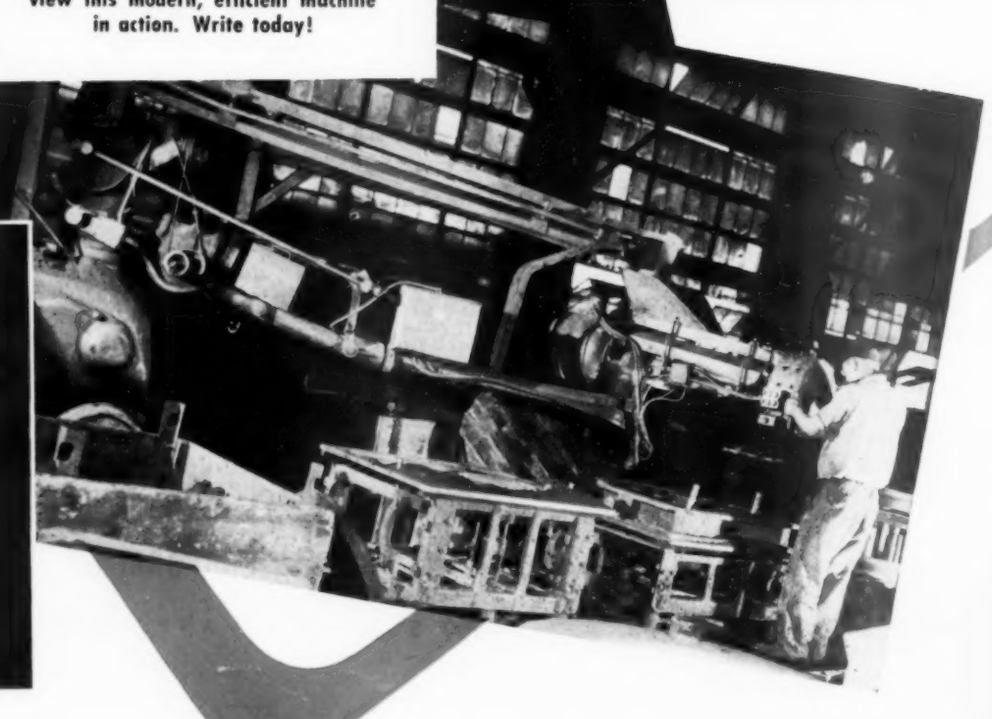
Shepard Niles
CRANE & HOIST CORPORATION

360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

17 YEARS OF "*SLINGER*" OPERATION AT ELMIRA FOUNDRY!

NEW Motive Speedslinger at Elmira Foundry Co., Inc., Elmira, New York. Operating along a 400 ft. track, it quickly rams any size pit or flask within the reach of its long arm. "Slinger" ramming is faster, more uniform than any other method!

See a "Slinger" in operation. A representative of The Beardsley & Piper Company will make arrangements for you to visit a nearby foundry and view this modern, efficient machine in action. Write today!



Elmira Foundry started to use this Motive Sandslinger (at right) 17 years ago! Still in excellent running condition, it is used for ramming small and medium size molds. Durability, speed and efficiency..."Slingers" are noted for all three!

FASTER, MORE EFFICIENT RAMMING!

Close-up view of the Speedslinger's ramming arm. It quickly rams to an even, predetermined hardness and can be controlled from soft to hard ramming for varying kinds of work.

The new Speedslinger at Elmira Foundry rams as much as 2,000 lbs. of sand per minute! It enabled Elmira to save molding floor space and keeps 36 men busy constantly in preparing molds for pouring after they have been rammed. Even greater output could be obtained if so desired. Over 60,000 lbs. of cleaned castings per day are made in molds rammed by the "Slinger." Just ask L. S. Caldwell, General Foundry Foreman of Elmira Foundry Co. what he thinks of "Slingers"!

Speedslingers

3' x 7' x 2' mold rammed by Elmira's "Slinger" in 5 minutes by 1 man. Hand-ramming would have taken 2 men over 3 hours.

THERE'S A SIZE AND TYPE OF "SLINGER" TO MEET YOUR INDIVIDUAL FOUNDRY NEEDS!

The size of a foundry and its particular ramming needs determine the best type of Sandslinger to use. There's a "Slinger" that will do your ramming —in less time and at lower cost!

The Speedslinger is the fastest ramming, most efficient unit in the "Slinger" family. The operator rides the ramming head and directs every function of the machine through centralized finger-tip control.

Working up and down the foundry on a track, it requires no elaborate or expensive sand handling system and carries its own sand to the job.

Write today for full information.

FOUNDRY EQUIPMENT MANUFACTURERS' ASSOCIATION, INC.

THE BEARDSLEY & PIPER COMPANY

2540 North Keeler Avenue Chicago 39, Illinois

THE BEARDSLEY & PIPER COMPANY ARE MANUFACTURERS OF SANDSLINGERS
SPEEDSLINGERS • SPEEDMULLORS • SCREENARATORS • MULBAROS
SHAKE-OUTS • SAND CONDITIONING MACHINES • GYRATORY SCREENS

A CONVEYOR-COORDINATED PLANT that you can be proud of!

ARE you satisfied with your present production plant? Does material or goods in process flow smoothly with the least disorder, loss of time, waste of space or man-power?

If there is room for improvement, isn't it a matter of better coordination—better linking of all the steps involved from receiving — to shipping?

Whether your rate of manufacture is several hundreds a minute or one an hour, Standard builds conveying equipment to meet the situation.

The range and versatility of Standard Conveyor equipment are the result of nearly 40 years of close contact with inside-the-plant transportation — in plants large and small, making products as widely diverse as steel or cosmetics. The benefit of this experience is available to you, without obligations. The counsel of Standard Conveyor engineers is valuable in deciding on the right kind of conveying equipment to coordinate operations faster — for lower cost.

Write for comprehensive reference book —"Conveyors by Standard"— Catalog No. F-26

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MEMBER

MANUFACTURER'S ASSOCIATION FOUNDRY EQUIPMENT INC.

(Continued from page 191)

Urging all supervisors to become genuinely interested in their employees, the speaker stated he must improve his approach to his workers. He must be cooperative, patient, loyal, helpful and cheerful at all times. More and more, management has come to realize that such qualities have to be developed in its supervisors by intelligent training courses. Most companies have discovered the conference type to be superior to other methods.

A short coffee talk was given by Municipal Court Judge Harvey Straub, in a humorous vein. Herbert Scobie of the Chicago office of the American Foundrymen's Association was on hand to give the members first-hand information on the educational features that he is directing.—*R. B. Bu..ting, publicity chairman.*

Northeastern Ohio

ELEVENTH annual Christmas party of the Northeastern Ohio Chapter of the AFA held in the Rainbow room, Hotel Carter, Cleveland on Dec. 13 was the usual sellout, with 1000 members and guests present to partake of a delicious turkey dinner with all the trimmings, and to enjoy a 2-hr floor show arranged under the direction of L. P. Robinson, chairman of the entertainment committee.

Regular monthly meeting was held Jan. 10 at the Cleveland Club, with 100 members and guests present. In the absence of President A. C. Denison, Vice President Henry Trenkamp presided. Speaker of the evening was T. L. Nelson, National Carbon Co., Niagara Falls, N. Y., who discussed "Carbon and Graphite Electrodes in Acid Steel Furnace Production." He described briefly the procedure employed in manufacture of both types of electrodes, and stated that graphite electrodes are homogenous while carbon electrodes, due to the method of production, are not. Graphite electrodes have about one-fourth the resistance of carbon electrodes, the current densities of both types are about the same, and graphite electrodes are mechanically stronger.

Mr. Nelson mentioned a number of factors to be considered in selection of the size of the electrode, and stated that the main point is to use the smallest electrode that will give the desired production. Where dipping the electrodes is practiced to adjust carbon content it is advisable to use lower cost carbon electrodes. Since both types of electrodes oxidize rapidly at 2900 to 3150 F, furnace operators should see that they are withdrawn slowly from the furnace before exposure to the atmosphere. Also the furnace doors should not remain open any longer than necessary. Proper han-

dling and storage of electrodes previous to use will reduce breakage. Following Mr. Nelson's talk a sound-motion picture film, "Carbon-Black Treasure," prepared by National Carbon Co., was presented. —*Edwin Bremer.*

Metropolitan

JAN. 7 meeting of the Metropolitan Chapter of the AFA, designated as National Officers' Night, was held at the Essex House, Newark, N. J., with approximately 100 members and guests in attendance. Fred J. Walls, national president, spoke of the aims and accomplishments of the national organization and Harold H. Judson, a director, extended greetings on behalf of the other chapters.

T. D. Parker, past chairman of the chapter, was presented with a token of appreciation by the chapter, and N. A. Kahn, chief metallurgist, Navy Department, was introduced by H. A. Deane, chapter chairman, as one of the few civilians decorated for their excellent work in the war effort.

T. J. Wood, technical chairman, introduced James S. Vanick, research metallurgist, International Nickel Co., who gave a talk on "Modern Cast Iron." Mr. Vanick detailed the progress made in controlling and adjusting the graphite formation of cast iron through the use of inoculants and alloying elements, to give the particular characteristics desired by the application engineer. These include such features as high strength, wear resistance, corrosion resistance and heat resistance. The captive foundries have and must continue to take the initiative in developing the ultimate in cast iron and in convincing engineers and designers that modern cast irons have possibilities which must not be overlooked— C. *J. Law.*

Chicago

CHICAGO Chapter of the AFA started its 1946 educational program on Jan. 14 with the first of a series of six lectures. This year's course covers current foundry problems and technique and is designed to benefit all who are now engaged in, as well as those preparing to enter, the foundry industry. Speakers are outstanding foundrymen, foundry engineers and metallurgists, and their lectures will be illustrated and supplemented by a number of motion pictures and slides.

Subject of the first lecture was "Patterns for High Production," and Vaughan C. Reid, president, City Pattern Foundry & Machine Co., Detroit, the speaker.

Dates, subjects and speakers for succeeding lectures are as follows: Feb. 1—

MULBARO Cuts

SAND PREPARATION TIME 50%

"A 50% cut in our core sand preparation time with the Mulbaro! That's a real saving!" say officials of the Milwaukee Flush Valve Company, Milwaukee, Wisc. "What's more, the Mulbaro has paid for itself in oil savings alone in less than a year, due to more thorough, more uniform sand mulling which meets our exact molding requirements." Foundries, large and small, use the Mulbaro for facing and backing as well as core sand.

How the Mulbaro works: Sand is shoveled into barrow. Filled barrow is then wheeled into position under the mulling unit.

Mulling unit is lowered onto barrow with a hoist. Required amount of oil is added and within a few minutes, sand is completely mulled.

Mulled sand is now moved away to molding machines; another barrow of sand is placed under mulling unit.

ONLY $895*

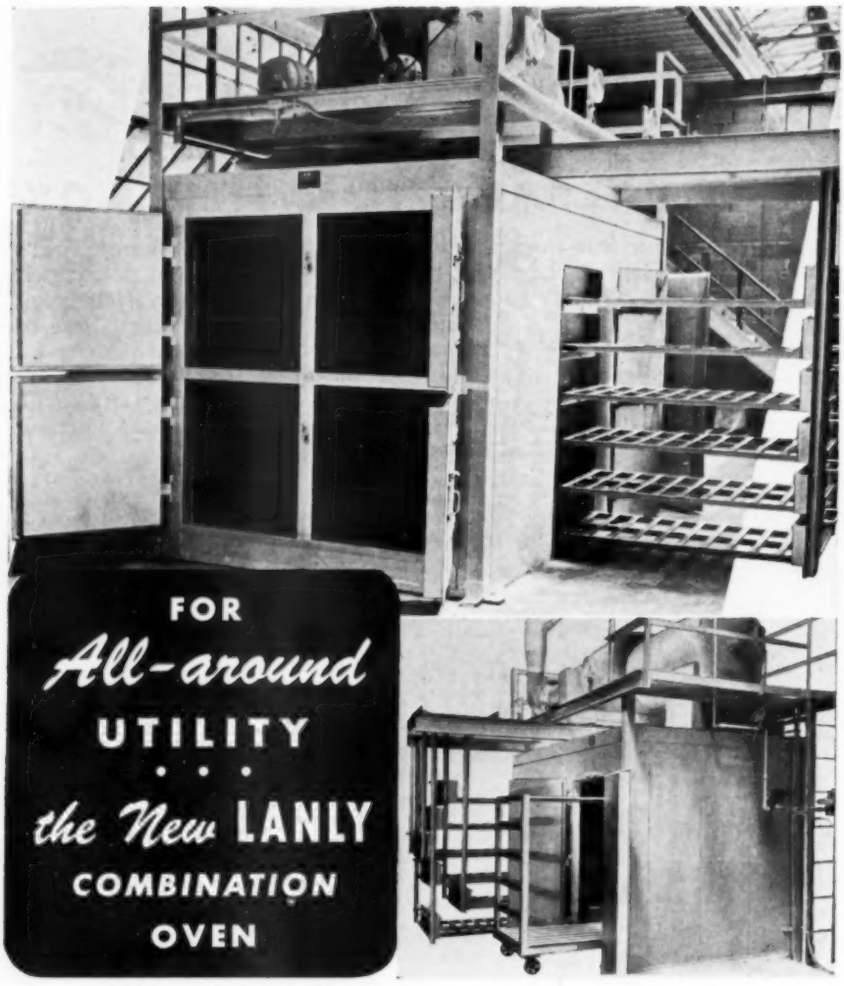
*Entire Mulbaro unit costs only $895.00 F.O.B. Chicago . . . additional barrows are $95.00 each.

Get complete engineering data and specifications on this amazing mullor . . . write today!

THE BEARDSLEY & PIPER CO.

2540 North Keeler Avenue Chicago 39, Illinois

Manufacturers of Speedslingers, Speedmullors, Sandslingers, Screenerators, Mulbaros, Shake-Outs, Sand Conditioning Machines



This new LANLY development combines shelf, drawer and rack-type ovens in one compact unit. It is heated by one efficient LANLY convection heater and the temperature is maintained uniformly by the latest instruments.

This oven is ideal for drying small molds or baking cores in smaller foundries and proves to be a valuable auxiliary in large plants.

Marked improvements are embodied, especially in the drawer-type section. Any drawer can be opened without disturbing others or all can be opened at the same time.

Each drawer is independently suspended on ball bearing trolleys and moves in and out without being raised at the outer end. Baffles at the inner ends of drawers prevent loss of heat while drawers are open. Core breakage is greatly reduced by the smooth, easy movement.

Write for information about this valuable new oven or any other equipment in which you may be interested.

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE · CLEVELAND, OHIO

"Molding Materials," by Harry W. Dietert, president, Harry W. Dietert Co., Detroit; Feb. 11—"Molding Methods — Part I," by Pat Dwyer, engineering editor, THE FOUNDRY, Cleveland; Feb. 27—"Molding Methods—Part II," subdivided under "Permanent Molding," by B. E. Sandel or John Mader, Stewart Die Casting Division, Stewart-Warner Corp., Chicago, "Centrifugal Casting," by Chester V. Nass, vice president and manager foundry division, Pettibone Mulliken Corp., Chicago, "Sand Slinger," by H. G. Slichter, sales manager, Beardsley & Piper Co., Chicago, and "Core Molding," by John Gellert, vice president, Nichol-Straight Foundry Co., Chicago; March 13—"Foundry Layout and Planning," by Lester B. Knight, president, Lester B. Knight & Associates, Chicago; and March 27—"Defective Castings—Causes and Cures," by William A. Hambley, works metallurgist, Allis-Chalmers Mfg. Co., Milwaukee, and Arthur S. Klopf, consultant, Lester B. Knight & Associates, Chicago.

The lectures will be given in the Peoples Gas Building auditorium, 122 South Michigan Ave. Oscar Blohm, metallurgist, Hills-McCanna Co., Chicago, is chairman of the lecture course committee, and Ray A. Witschey, ceramic engineer, A. P. Green Fire Brick Co., Chicago, is secretary.

Regular monthly meeting of the Chicago Chapter was postponed from Jan. 7 to Jan. 9, at which time the chapter met jointly at the Chicago Bar Association with the Chicago section, American Institute of Mining and Metallurgical Engineers, the latter officiating as host and having arranged the program.

D. A. Potter, group leader in charge of precision casting, Naval Research Laboratory, Washington, was the speaker on the subject of "Precision Casting." Being intimately acquainted with this newest method of casting technique having been associated since 1942 with work done at the laboratory, Mr. Potter made an excellent presentation to the capacity audience of 300.

J. E. Drapeau Jr., technical director, Metals Refining Co., Division of Glidden Co., Hammond, Ind., and chairman, Chicago section, AIME, and J. C. Gore, Chicago manager, Werner G. Smith Co., and president, Chicago Chapter, AFA, presided as co-chairmen. During the coffee period, William E. Brewster, general superintendent, Wisconsin Steel Works, a past chairman of the Chicago section, spoke briefly on the history and purpose of the AIME, and William W. Maloney, national secretary, AFA made a similar presentation on behalf of the latter.—*Erle F. Ross.*

Two INDUSTRIAL NAMES BECOME ONE!

Improved core oil service for foundries throughout the nation is assured by the recent acquisition of the Certified Core Oil & Mfg. Co. by Socony-Vacuum Oil Co., Inc.

There will be no changes in the general policies of Certified Core Oil & Mfg. Co. under the new ownership, nor in its relationships with its customers. The entire sales organization will continue intact. Mr. Thomas G. Waugh, founder and president of Certified Core Oil & Mfg. Co., will remain as general manager of the new Certified Core Oil Division of Socony-Vacuum Oil Co., Inc.

As one of the oldest and largest oil companies in the world, Socony-Vacuum Oil Co., Inc. has vast resources, a high reputation for quality, abundant technical knowledge, and an enviable record for producing dependable products. The affiliation of Certified Core Oil with this international organization will greatly strengthen our competitive position, and give us the ability to serve foundries everywhere with an even higher degree of efficiency than in the past.

The new ownership will prove highly advantageous to all Certified Core Oil users. In this, our first message under the new ownership, we assure every foundry of our untiring efforts to continue to merit their valued core oil business. We also extend our sincere appreciation to those who have favored us with their patronage in the past.

Certified Core Oil will continue to be available in three general types: *Certified Golden Core Oils, Certified Unique Core Oils,* and *Certified Rapidry Core Oils*—each in several grades as in the past. Among these three grades—all of which have been proved with years of actual service—there is the ideal core oil for every foundry.

We still maintain our position that "Core oils to be right must be prescribed," and, accordingly, when a foundry supplies us with details of its operating conditions, we furnish a prescribed core oil that is based on years of experience in serving thousands of foundries.

• •

Too, every shipment of Certified Core Oil must live up to our claims and completely satisfy the user, or be returned for full credit! This guarantee continues in effect!

CERTIFIED CORE OIL DIVISION
SOCONY-VACUUM OIL COMPANY, INC.

3308-26 South Cicero Avenue, Cicero, Illinois.

Stock and representatives:

Buffalo, N. Y.; Elmira, N. Y.; Worcester, Mass.; Bloomfield, N. J.; Reading, Pa.; Sunbury, Ohio; Milwaukee, Wisc.; St. Louis, Mo.; Minneapolis, Minn.; Birmingham, Ala.; Houston, Tex.; Denver, Colo.; San Francisco, Calif.; Portland, Ore.

NEW and UNIQUE! » THE CARTRIDGE BENCH CORE BLOWER

*Users report remarkable increases in quality and quantity of production

Produces variety of intricate cores with unusual speed and simplicity.

Comes ready to use—virtually no installation cost.

Can be operated with unskilled labor—extremely easy to use.

If you make cores 2 lbs. or under—this unit ideally suited to your use.

Designed by two practical foundrymen.

WRITE for complete details and new booklet

Core boxes can be made very light, in most instances bench equipment now used can be converted for blowing. Almost any sand now commonly used on the core bench may be used for blowing cores. Adjustment for boxes of different height, size and shape made instantly.

To operate, core box and cartridge are held down by pressure handle while left hand operates blow valve. After core has been blown, the box is pulled forward and cartridge is lifted off and the work of drawing core is completed on base of machine.

FILLS NEED FOR SIMPLE, FLEXIBLE CORE BLOWER

The New *Redford Cartridge Bench Core Blower* has met with enthusiastic acceptance by foundrymen because it supplies an important need in the foundry for an efficient, low-cost method of blowing small, intricate cores. It requires no large volume of air and readily lends itself to handling a variety of core boxes. In fact, they tell us that it is the ideal method of making cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

SAND CARTRIDGES AVAILABLE IN 8 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in seven additional standard sizes and special sizes furnished where needed.

★ Cartridge Bench Core Blowers

Redford IRON & EQUIPMENT CO.

Phone: REdford 8610

21315 West McNichols Rd. Detroit 19, Michigan

USING SYNTHETIC RESIN CORE BINDERS

(*Continued from page* 112)

definite drop in strength with protracted oven timing.

Note already has been made of the fact that certain dry resin binders which have a parting agent mixed with them, show cleaner action of the sand mix, but at some sacrifice in green compression strength. It also was found that moisture content of resin mixes is somewhat critical. The amount of water added, mulling time, length of time in the chutes and the length of time on the racks must be controlled with great precision if reproducible results are to be obtained.

Determination of gas content indicates 5½ cc per gram of prepared and baked core sand. Sand mix was composed of 420 g No. 26 silica sand; 280 g float sand; 7 cc liquid synthetic binder and 42 cc water. Cores were baked 60 minutes at 300 F. Determination was made by grinding a tensile core specimen and taking a 5-g sample. Sample was placed in a combustion furnace maintained at 1800 F and burned in an atmosphere of carbon dioxide. Gases were collected over water.

TABLE I—Core Sand Mixes

Mix No. 1

200 lb sand
2 lb boric acid
2 lb sulphur
4 lb fly ash
1 qt synthetic liquid binder
5-7 per cent moisture

Mix No. 2

200 lb sand
2 lb boric acid
2 lb sulphur
4 lb fly ash
1 lb synthetic dry binder
5-7 per cent moisture

Mix No. 3

200 lb sand
4 lb fly ash
1 lb fluoborate
1¼ lb synthetic dry binder
¼ lb Southern bentonite
5-7 per cent moisture

A favorable position gas-wise does not argue that liberties can be taken in venting resin-bonded cores. Gas can be formed more freely from a bonding agent as susceptible to heat action as urea-formaldehyde binders. It has been pointed out in this connection that although the total amount of gas evolved from a resin mix may be no greater than with another type mix, the peak gas pressure tends to be higher and the time the peak is reached is earlier when the

(*Continued on page* 200)

No. 13 of a Series: "Looking at the FIVE ESSENTIAL THINGS you never see in ELECTRODES."

IMPROPER storage and handling can seriously damage the careful surfacing, end facing, and precision threading of your "National" carbon or "Acheson" graphite electrodes.

That is why National Carbon Company, Inc., has just designed a new electrode storage rack. It's highly practical, economical, and easy to construct. Each tier in the new rack is independent of the others. The members on which the electrodes rest increase in length at each end from the top of the rack down, to facilitate loading and unloading. The rack can be built to store a carload or more of electrodes of any size.

Need design help? If you need aid in adapting this rack to your plant, or have a special electrode storage problem, National Carbon engineers will be glad to assist.

Designing this new rack . . . and helping you with special storage problems . . . is *customer service*—one of the five essential things you never see in "National" and "Acheson" electrodes. The others: selection of raw materials, manufacturing experience, manufacturing control, and continuing research. All combine to give you greater all-round value in "National" or "Acheson" electrodes.

NATIONAL CARBON ACHESON GRAPHITE

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Unit of Union Carbide and Carbon Corporation
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GENERAL OFFICES: 30 East 42nd Street, New York 17, N.Y.
DIVISION SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: Canadian National Carbon Company Limited, Toronto 4, Canada

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MILWAUKEE
REG. U.S. PAT. OFF.
Machine Tools

WF-5

You save on your initial investment . . . save on production costs, for patterns big and small

- with the DELTA UNISAW*

Features of the Delta-Milwaukee Unisaw

Big capacity (table is 20" x 27"; with wings, 36" x 27") . . . Space of 12" in Front of Blade . . . Cuts to Center of 50" Panel . . . Rips Stock Full 3⅛" Thick . . . True-running Arbor . . . Lubricated-for-life Ball Bearings . . . 3-Belt Drive . . . Double-face, Double-lock Rip Fence . . . Patented Auto-Set Miter Gage . . . Accurate Calibrations on Settings . . . "Point-of-use" Controls and Locks . . . Fully-enclosed Motor . . . Rigid Cabinet Base . . . Streamlined Base . . .

Many Other Delta-Milwaukee Features.

A heavy-duty tilting arbor circular saw that makes a 3 1/8" cut with a 10" blade

You spend several hundred dollars less to start with. You save on all pattern work — by turning out any-size job quickly, easily, accurately.

Famous Delta-Milwaukee design and construction features provide advantages that mean dollars-and-cents to you.

You get a rugged, substantial machine that can stand the punishment of steady production. You get speed and consistent accuracy on sustained operations. You enjoy easy adjustment, for quick changes from one job to another.

Investigate the possibilities of the big-capacity Delta Unisaw for your pattern production. Compare it feature-for-feature with other machines. Check the experiences of enthusiastic users. See your Delta industrial distributor now.

*Trade Mark Reg. U. S. Pat. Off.

Get Your Copy of Free Catalog . . .

Pictures and describes in detail the Delta Unisaw. Also other low-cost Delta-Milwaukee woodworking machines that help produce finished work of credit to your company. Request your copy by coupon at right.

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Please send me your catalog of compact, portable, low-cost Delta-Milwaukee woodworking machines.

Name.....
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(.....) State.....

(*Continued from page* 198)

resin mix is used for internal cores that to a large extent are covered with metal. This difficulty is applicable to only a small percentage of work. Nevertheless, it does represent a hazard which must be reckoned with.

Some tests have indicated that a dry parting added in critical amounts to a powdered type synthetic binder by the manufacturer will keep the resin from "dusting out" in the sand mixing operation. Such processing helps flowability of the mix, retards crusting of the mix with air drying, but detracts from the total strength otherwise available in bonding. Another drawback observed with synthetic binders results from air drying

TABLE II—Core Sand Mixes

Mix No. 1

1020 lb 60 AFA sand
4 qt liquid synthetic binder
7½ lb sulphur
5 lb boric acid
6 lb corn flour
4 per cent water

Mix No. 2

1500 lb zirconite sand
3¾ lb sulphur
3¾ lb boric acid
13½ lb dry synthetic binder
2 per cent moisture

Mix No. 3

1020 lb 60 AFA sand
9 lb dry synthetic binder
7½ lb sulphur
5 lb boric acid
4½ lb corn flour
4½ lb dextrine
4 per cent moisture

Mix No. 4

400 lb 35 AFA sand (sandblast)
100 lb 65 AFA sand
2½ qt liquid synthetic binder
3¾ lb sulphur
2½ lb boric acid
3 lb corn flour
4 per cent moisture

Mix No. 5

100 lb 65 AFA sand (bond)
¾ lb sulphur
½ lb boric acid
10 oz corn flour
⅙ oz methylene blue
1 pt liquid synthetic binder

of thin-section cores. Small cores dried substantially before going to the oven show a marked lowering of final strength as well as erratic end results. Spraying the cores with water before oven drying might correct this condition, but the operation represents increased cost.

Odor occurring during disintegration of urea binders in contact with molten metal comes from malodorous amines formed and liberated. Phenolic binders are favorable in this respect and show good collapsing traits with iron and steel, but it is believed that aluminum and magnesium are not hot enough to effect as complete a breakdown of the binder as with ureas, and hence are not so adaptable to nonferrous metals. In one aluminum foun-

(*Continued on page* 202)

MEMO

On a modern method of DEOXIDIZING AND INOCULATING IRON

As an inoculating agent, easily added to the charge, FERROCARBO Briquettes by CARBORUNDUM have now become a standard practice in many of the nation's largest foundries for improving the general quality of an iron. Listed are ten specific advantages of a major nature which make a substantial contribution to the improvement of physical and mechanical properties.

An interesting feature often reported, resulting from controlled deoxidation, is the prolonged fluidity at lower temperatures. Thus the last of the metal in the ladle can be depended on for equally sound castings. Complete information on FERROCARBO Briquettes by CARBORUNDUM is yours for the asking.

THIS PROVEN CUPOLA INOCULATING AGENT—

1. Is simple to use—economical in cost.
2. Produces inoculated irons by a unique and proven method.
3. Gives super-heated iron of greater fluidity.
4. Provides superior deoxidation.
5. Improves structure.
6. Improves physical and mechanical properties.
7. Improves machinability—fewer rejects.
8. Increases wear resistance.
9. Reduces effect of foundry operating variables.
10. Promotes uniformity and reproducibility of structure and properties.

Our metallurgical staff will gladly arrange to give you individual information on the use of this product, at your convenience.

FERROCARBO Briquettes

BY CARBORUNDUM

TRADE MARK

THE CARBORUNDUM COMPANY, Refractories Division, Dept. L-26, Perth Amboy, New Jersey

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland and Birmingham; Miller and Company, Chicago, St. Louis and Cincinnati

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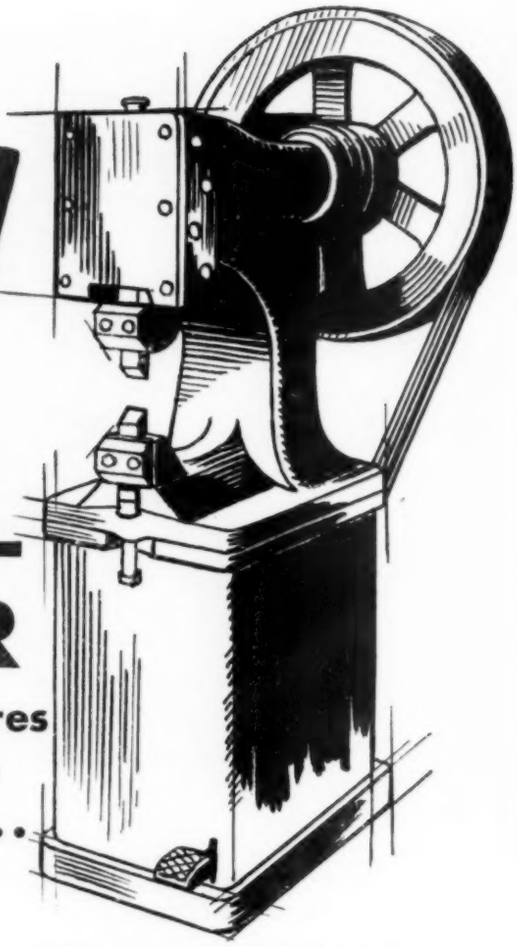

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TESSMER

SPRUE-CUTTER

Has the Features You've Been Waiting For . . .

1. **Improved Clutch** — Simple, rugged, conventional punch-press type, designed for continuous, trouble-free service.
2. **New Brake** — One-piece flexible-band style. Larger braking surface assures positive, accurate control.
3. **Rear Cam Rod Bearings** — Enclosed in separate, removable bracket. Makes all clutch parts easily accessible.
4. **Knife Caps** — Steel tapered end type with no protruding nuts. No danger of pinching operator's fingers; provides work-piece freedom.
5. **Alemite Lubrication** — Makes it easy to lubricate all moving parts.
6. **Foot Pedals** — Placed at right side of base . . . enable operator to work with natural movements, in normal position.
7. **Massive Steel Base** — Results in less weight with greater strength and rigidity.
8. **V-Belt Drive** — If motor is mounted in base.
9. **Shelving in Base** — For storage of tools and equipment — if machine is not motor driven.

These features mean higher postwar standards of performance, workmanship and service for the famous Tessmer Sprue-Cutter — a top favorite in the cleaning departments of non-ferrous foundries for many years. Available NOW. Write for particulars.

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(Continued from page 200)

dry using large quantities of dry type synthetic binder in modified form with certain additives, it is believed that the addition of dextrine masks the odor of urea during pouring.

In commenting on the use of liquid synthetic binders for magnesium, one foundry notes the excellent moisture-resistant qualities in the cores, stating that cores in storage for several weeks caused no trouble when taken to the foundry. Also, a reduced time for baking was observed. Features of synthetic binders stated by this foundry are: Low cleaning room costs, low baking temperatures, fast oven time, and few rejects. Another foundry which used both dry and liquid type synthetic binders for magnesium castings prefers the liquid type. With the powder type binder it was noticed that it was driven off in the air during mulling. However, this tendency may have been accentuated through use of high-speed mulling equipment, and more particularly by the fact that water is added last to the sand mix.

Cores made in halves at this plant are held together by dusting dextrine over the surfaces before baking. On one type of core it was found that substituting corn flour for bentonite cut the baking time substantially. Sand mixes developed by the firm included one for an oil sump casting which provided fast collapse on pouring and a smooth finish of metal lying against the core. Cutting a casting in half, as shown in Fig. 1, reveals a shine on the interior surface.

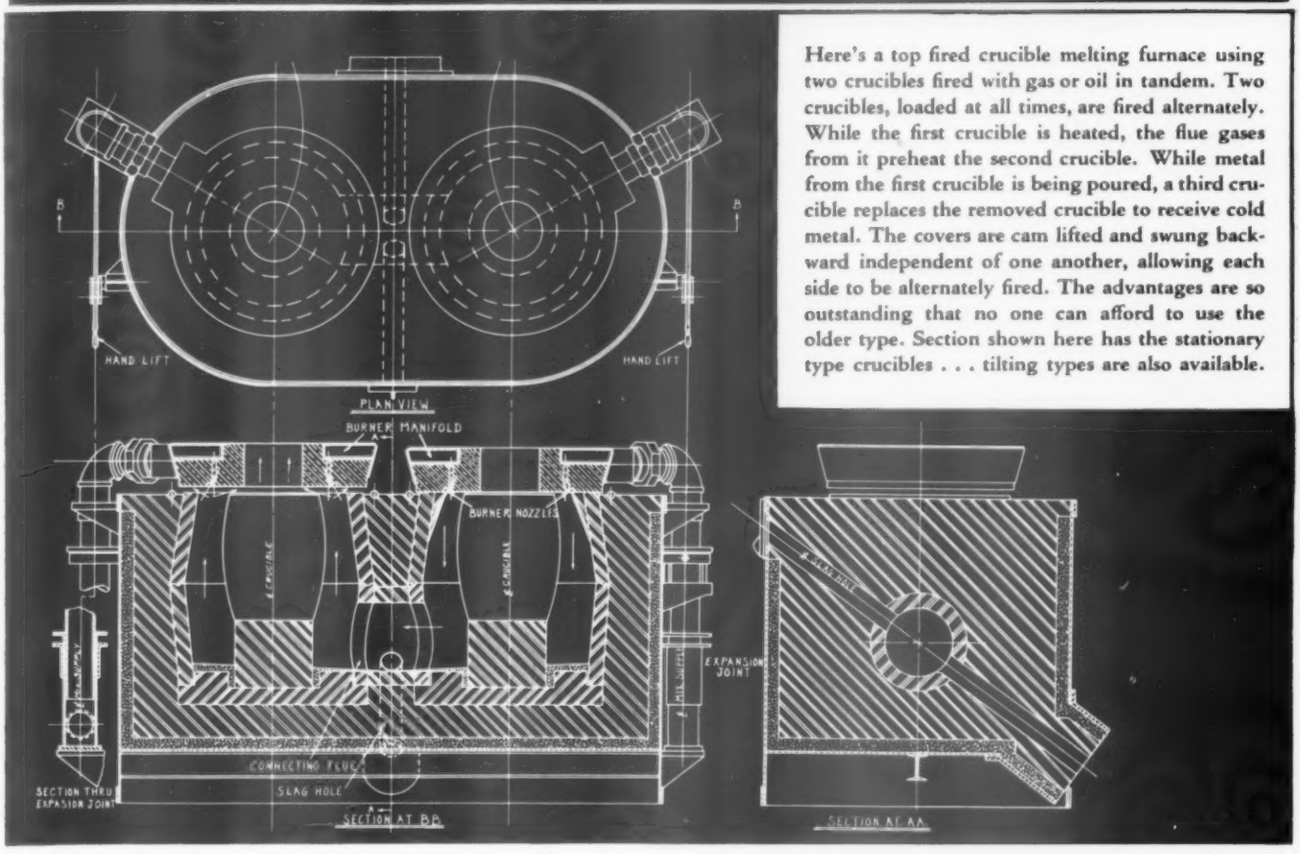
Baking Temperature Important

One good way to get a clear picture of heat reactivity in synthetic binders is through examination of tensile strength of test cores baked at predetermined temperatures for different lengths of time. For example, if tensile cores are made with 1 per cent by weight of liquid synthetic binder baked at varying temperatures and checked for strength, a curve can be plotted which may rise or fall with protracted baking, as shown in Fig. 5. Test cores baked for 30 minutes at 300 F have developed a tensile strength of 65 psi and for 2 hours showed 199 psi. At that temperature the strength continues to increase as moisture is drawn progressively from the core. At 400 F a top strength of 185 psi will be developed in 30 minutes which will drop to 103 psi in 2 hours. That temperature is too high for a soaking bake. At 500 F the bond can be destroyed in 60 minutes, but a 30-minute bake will develop a tensile strength of 145 psi.

Rapid baking qualities of the synthetic binders suggested the use of infra red as an alternate means of setting the binder

(Continued on page 204)

NEW IT'S DIFFERENT IT'S BETTER NEW



Here's a top fired crucible melting furnace using two crucibles fired with gas or oil in tandem. Two crucibles, loaded at all times, are fired alternately. While the first crucible is heated, the flue gases from it preheat the second crucible. While metal from the first crucible is being poured, a third crucible replaces the removed crucible to receive cold metal. The covers are cam lifted and swung backward independent of one another, allowing each side to be alternately fired. The advantages are so outstanding that no one can afford to use the older type. Section shown here has the stationary type crucibles . . . tilting types are also available.

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2. 50 to 100% longer pot life.
3. 50 to 100% longer lining life.
4. 50 to 100% longer cover life.
5. 50 to 100% longer burner life.
6. Easy to charge. (No flame through cover)
7. Far lower metal loss. (Flame does not impinge on metal)
8. Faster heating. (Combined radiant and convection heating)
9. Less slagging. (Less slagging and no slag build up possible)
10. Lining is easy to replace. (No burner ports)
11. Burners easy to inspect and replace. (Change in 15 minutes)
12. Burners cannot plug. (Burners in top where slag or metal cannot reach them)
13. Pure metal. (Neutral pressure on metal surface allows charcoal or atmosphere to be used)
14. Furnace can be flued through the floor to the outside, eliminating heat and gases in foundry.
15. No leakage of cover. (No flame through or around cover)
16. Quiet operation.
17. Unobstructed flueing. (Flued at bottom and charge does not affect it)
18. Metal is visible at all times and temperature can be taken at any time, without shutting off burners.

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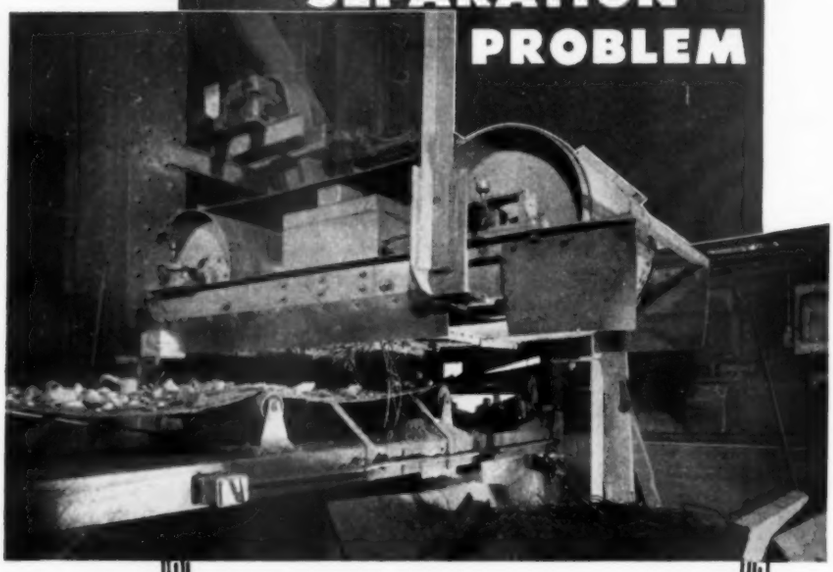
How the New Dings Self-Cleaning Rectangular Magnet Solved a TOUGH SEPARATION PROBLEM



the PROBLEM Installing an effective magnetic separator in a large steel castings foundry for removal of scrap from the shakeout sand conveyor belt was difficult because of space limitations at the belt end preventing installation of a magnetic pulley, plus a large percentage of metal and a thick normal burden of material on the belt.

the SOLUTION Dings Engineers recommended installation of one of the powerful new Dings Self-Cleaning Rectangular Magnets above the conveyor. This machine provides the necessary magnetic strength to lift scrap out of the heavy burden efficiently, and gives clearance above the belt sufficient to prevent jamming even under unusually heavy load conditions. A transverse belt carries accummulated scrap off the conveyor and dumps it alongside, as shown above.

This is one example of the work in solving magnetic separation problems that Dings Engineers are doing throughout industry. And Dings "High Intensity" Magnetic Separators *stay* on the jobs that are set for them, year after year, and at costs for operation and maintenance that are negligible in even the smallest foundry's cost sheets.

Write today for full details on the complete line of Dings "High Intensity" Magnetic Separators. If yours is a special problem, Dings Engineering Service is available at no obligation to you.

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"Magnetic Separation Headquarters Since 1899"

Dings
"HIGH INTENSITY"

(*Continued from page* 202)

or bringing it to a cured condition. An average lot of commercial cores was made and baked in a lamp tunnel. Thermocouples were applied to the surfaces and centers of the cores, and temperature changes recorded. Cores ranged up to 7 in. high and 13 lb in weight. With four rows of lights in service directed on the top and sides of the cores as in Fig. 2, it was observed that vapor began to rise from the cores almost at once. Cores were found sufficiently exposed shortly before the center thermocouple broke over the reading which indicated that moisture still was present. They were taken from the light tunnel at that point and came to a cured condition from the heat within the cores. Thin cores ½-in. thick were baked in 10 to 15 minutes; tensile cores in 20 to 25 minutes, and larger cores in 50 to 75 minutes. Estimates of power required for baking were made and indicated no additional cost as compared with other methods of baking.

Use of cereal binders in combination with synthetic resins can develop special values favorable to control of surface and center hardness. If they are chosen for their water soluble characteristics, it is possible to increase migration and develop a specially dense and hard surface on the core. Dextrine is helpful in this regard since certain grades are rated as 95 per cent water soluble. Also favorable to the combination is the fact that synthetic resins act as a waterproofing agent for dextrine to the extent that cores made with 1 per cent each can be stored in a moist atmosphere without losing any more strength than other types of binders.

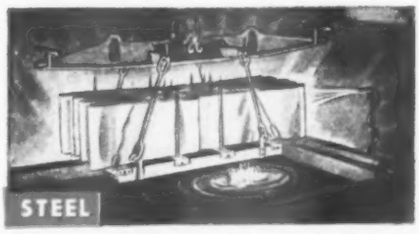
Determine Water Absorption

The test used to determine moisture absorption was the same as that described by Harold S. Austin and Carl E. Schubert in the June, 1940, issue of THE FOUNDRY under the title "Eliminate Variables in Core Testing." The combination of cereal and synthetic binders also adds heat resistance to protracted baking. While cores made with only liquid synthetic binders can be disintegrated in 60 minutes at 500 F, a mix containing 1 per cent each of liquid synthetic and No. 152 dextrine will show 117 psi tensile strength at the end of a 2 hour bake. Fig. 4 depicts curves for this sand mix and shows a rising curve at 300 F and slightly falling curves at 400 and 500 F, with a tensile strength as high as 349 psi developed in a 30-minute bake at 400 F.

Other cereal binders can be used with liquid synthetics to build up center strength in cores. Certain types will rate as 50 per cent water soluble. They help to stiffen the center of the core and partly migrate to add to surface hardness.

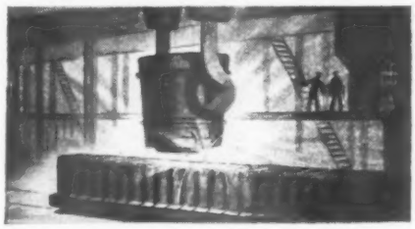
(*Concluded on page* 206)

FOR DEPENDABILITY IN METAL CHEMICALS

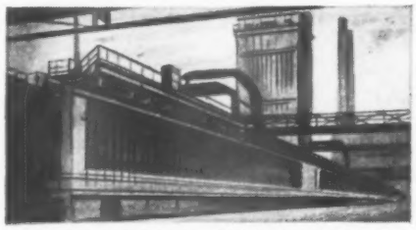


PICKLING—Sulfuric Acid—Hydrofluoric Acid—Muriatic Acid—Nitric Acid—Phosphoric Acid—Chromic Acid.

Detergents: Sodium Metasilicate—Trisodium Phosphate—Sodium Silicate—Tetrasodium Pyrophosphate.



RIMMING STEEL—Sodium Fluoride for smoother-surface rimming steel.



COKE BY-PRODUCTS—Sulfuric Acid for making ammonium sulphate; for washing toluene and benzene, and for treating light oils.

Sodium Cyanide—Sodium Fluoride—Sodium Cyanate—Potassium Cyanate, for heat treating and controlling temperature.

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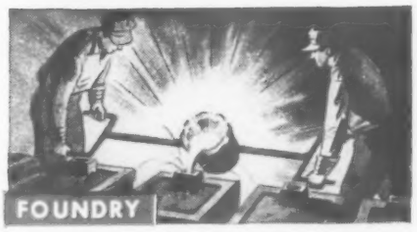

Casting Cleaning Acid (Hydrofluoric Acid)—Sodium Silicate—Zinc Chloride—Chromic Acid • Ammonium Fluoborate—Sodium Fluoborate—Potassium Fluoborate, Anti-oxidants and inhibitors • Potassium Fluoride—Lithium Fluoride and Other Welding Fluxes • Fluoboric Acid: Solvent for silica, in cleaning surfaces.

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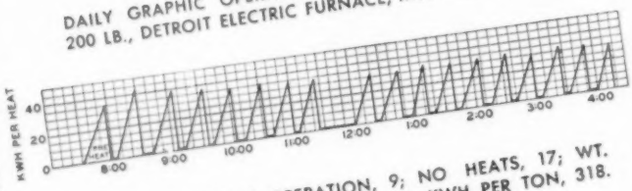
NEW TYPE DETROIT ELECTRIC FURNACE SIMPLIFIES SHELL INTERCHANGE

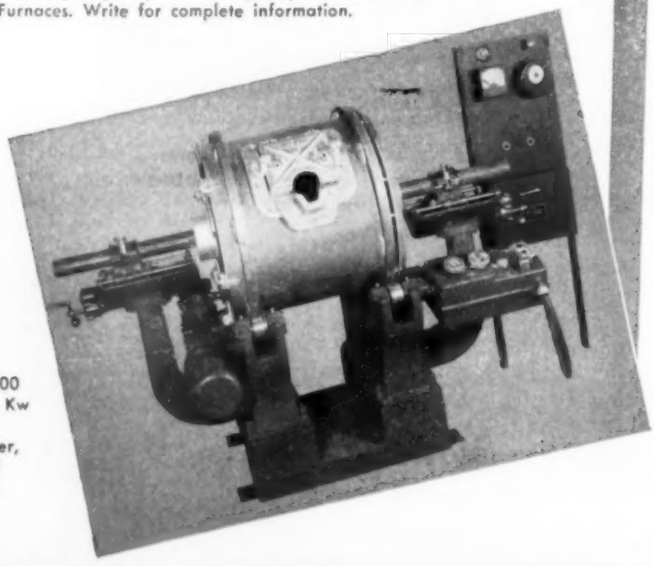
Operating Record in melting of Red Brass reveals production efficiency

DAILY GRAPHIC OPERATING RECORD, TYPE LF, 75 KW, 200 LB., DETROIT ELECTRIC FURNACE, MELTING RED BRASS.



SUMMARY: HOURS OPERATION, 9; NO HEATS, 17; WT. PER HT., 225 LBS.; Kwh TOTAL, 608; KWH PER TON, 318.

Simplified in construction, more compact in design, the new type LF, 200 lb. Detroit Rocking Electric Furnace illustrated below will speed production melting of ferrous and non-ferrous metals in your foundry at reduced cost. In a typical day's operation, this modern furnace melted 17 heats of red brass—225 lbs. per heat—in 9 hours. That's 3825 lbs. of superior quality metal produced with clock-like precision throughout the day with a total overall energy consumption of only 318 Kwh per ton. Power is brought in to the electrodes from either above or below by copper conductors to the stationary pedestal type supports of the non-rotating electrodes. Interchanging of furnace shell involves only the withdrawal of the electrodes allowing the shell to be lifted since there are no detachments to be made. Base mounted electrode brackets, complete with meter panel and contactor box, provide a clear, untrammeled working area for the operator who has all controls at his fingertips. For faster, cleaner production of castings of superior quality in your foundry, depend on Detroit Rocking Electric Furnaces. Write for complete information.



New type LF, 200 lb. capacity, 75 Kw Detroit Electric Furnace for faster, more economical foundry melting.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Concluded from page 204*)

Other cereal binders rating from 9 to 11 per cent water soluble will increase center strength with little or no migration. As little as 0.34 per cent liquid synthetic binder and 1 per cent dextrine will produce cores of average strength and with a firm hard surface. For cores of particularly high strength 1 per cent powdered synthetic and 0.5 per cent corn flour can develop tensile values beyond the measuring capabilities of the universal sand strength testing machine.

Stressing the applicability of synthetic resin core binders to aluminum and magnesium does not mean that they are limited to nonferrous metals. Resin binders with or without cereal binder can be used for gray cast iron. Malleable iron castings have been produced with resin core binders, and for blown cores where a quick collapse was needed the mix was composed of 475 lb lake sand, 25 lb molding sand, 9 qt silica flour, 6 lb corn flour, 2 lb dextrine, 1 qt liquid synthetic resin, 2 qt kerosene, and 5 qt water.

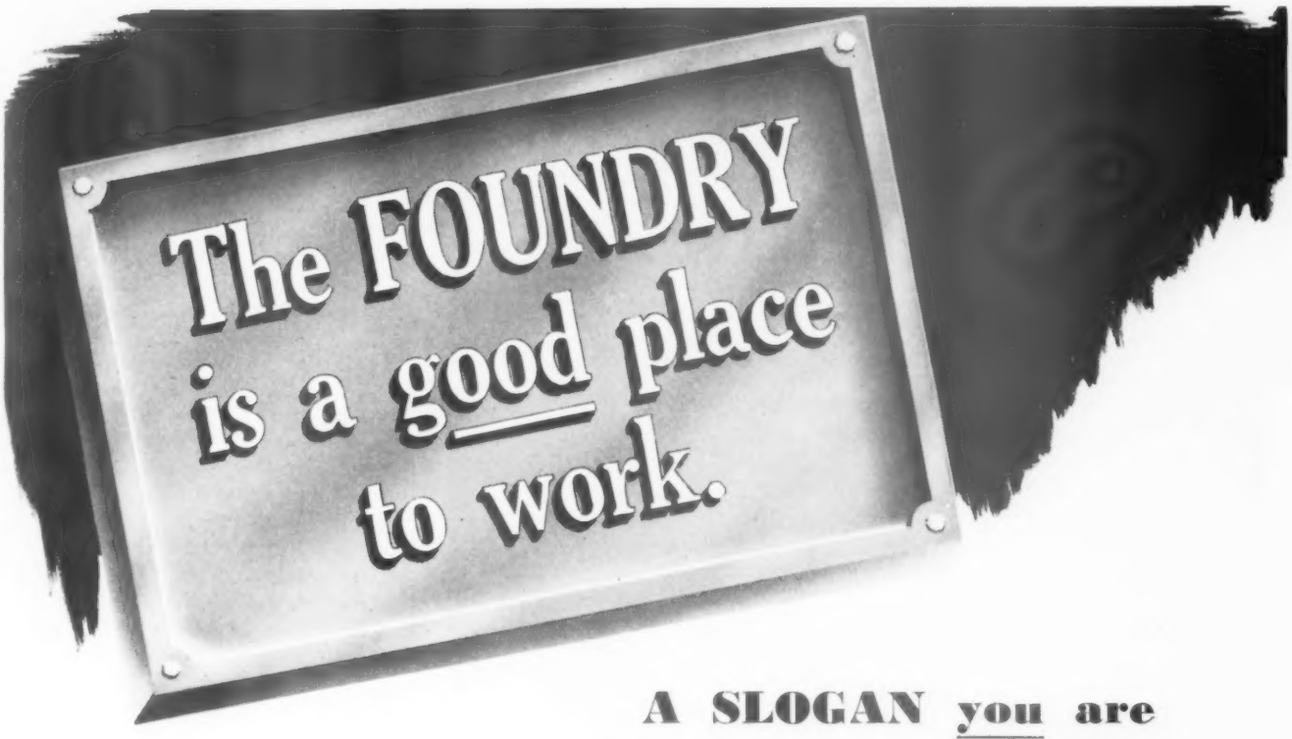
Used in Steel Casting Cores

Steel castings have been made with synthetic resin bonded cores. Cores are processed for center strength to suit the castings being made. Where a wash is used with other types of bonds, the same practice is advocated with resin bond. One sand mix which has worked well was composed of 850 lb silica sand, 150 lb silica flour, 10 lb corn flour, 10 lb liquid resin binder, 5 lb kerosene and 30 lb water.

In preparation of this article the author wishes to acknowledge assistance of various individuals associated with the following firms: Utica Radiator Corp., Utica, N. Y.; American Radiator & Standard Sanitary Corp., Louisville, Ky.; Dow Chemical Co., Bay City, Mich.; Aluminum Co. of America, Cleveland; Harry W. Dietert Co., Detroit; Wellman Bronze & Aluminum Co., Cleveland; Howard Foundry Co., Chicago, and Fostoria Pressed Steel Corp., Fostoria, O.

Laclede-Christy Buys Southern Company

Laclede-Christy Clay Products Co., St. Louis, has purchased the properties and business of the Alabama Clay Products Co., Birmingham. These properties will continue to be operated as the Alabama Clay Products Co., a wholly-owned subsidiary of Laclede-Christy. A. S. Holberg, president of the Alabama company, will continue with the organization, with H. W. Gethin, recently Pittsburgh district manager of Laclede-Christy, becoming vice president and general manager at Birmingham.



A SLOGAN you are making a REALITY—

The American Foundrymen's Association has adopted a dynamic slogan: "The Foundry is a Good Place to Work".

It is not a slogan by which foundries pat themselves on the back and take a self-satisfied attitude. It is a vital ideal to work toward! It is a target to shoot at!

And many foundries are hitting the bull's eye! They are modernizing their equipment to make their shops healthful and efficient places in which to work. They are establishing scientific methods to replace rule-of-thumb methods. They are educating workers to see the opportunities in the modern foundry . . . and they are training them to make the best use of these opportunities.

These foundries are finding that it pays . . . and pays big . . . to strive toward new horizons in foundry methods. Modernization attracts more business . . . and helps to hold it. It attracts better men . . . and helps to hold them.

Yes, "the Foundry is a good place to work." In thousands of foundries this slogan is already a reality; in others it is rapidly being realized. It is inspiring improvement and advancement. It is helping to establish new high standards. It is a challenge to strive toward better and better working conditions, and higher and higher standards of efficiency.

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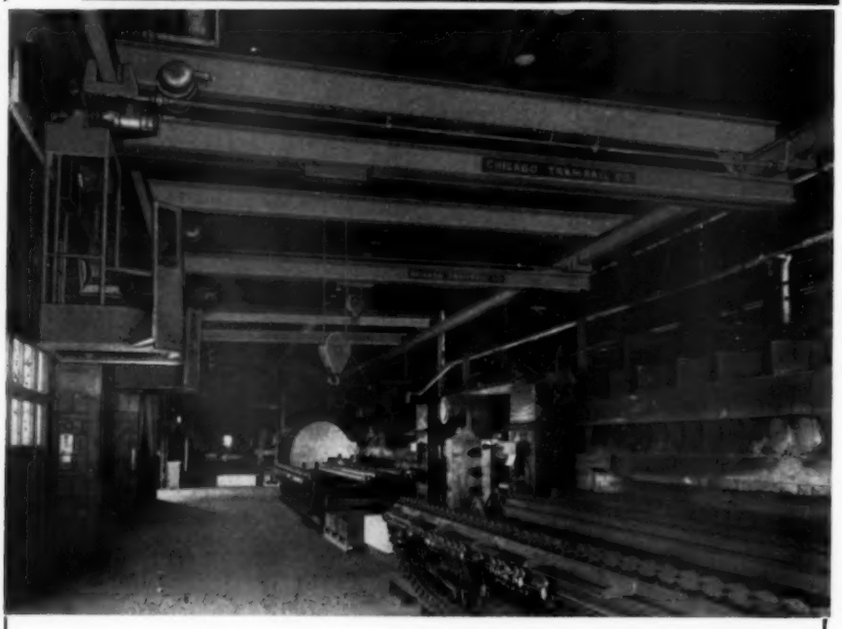

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The finished forging is then discharged, the crane backs the remainder of the billet out of the machine and delivers it to the tail end of the conveyor onto the "V" groove with the end protruding to repeat the operation over and over.

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AGE OF GREEN AND DRY SAND MOLDING

(*Continued from page* 97)

land in search of improvements in foundry practice. It is clear from historical records that Darby was interested primarily in the substitution fo iron for brass in the manufacture of small commodities. An invention standing in his name and that of his associate, John Thomas, is recorded in the *British Patent Journal* for the year 1707. Unfortunately all that is known of this with certainty is the title: "A New Process for the Casting of Iron Bellied Pots and Other Iron Bellied Ware in Sand Only Without Loam or Clay". All the contemporary records are agreed that the inventors took infinite precautions to maintain the secrecy of their methods, and because of this there has been much speculation as to the nature of this discovery. The most rational is the view crediting Darby with the introduction of green sand and/or possibly dry sand in conjunction with multi-parted molding boxes.

Darby Was Not First

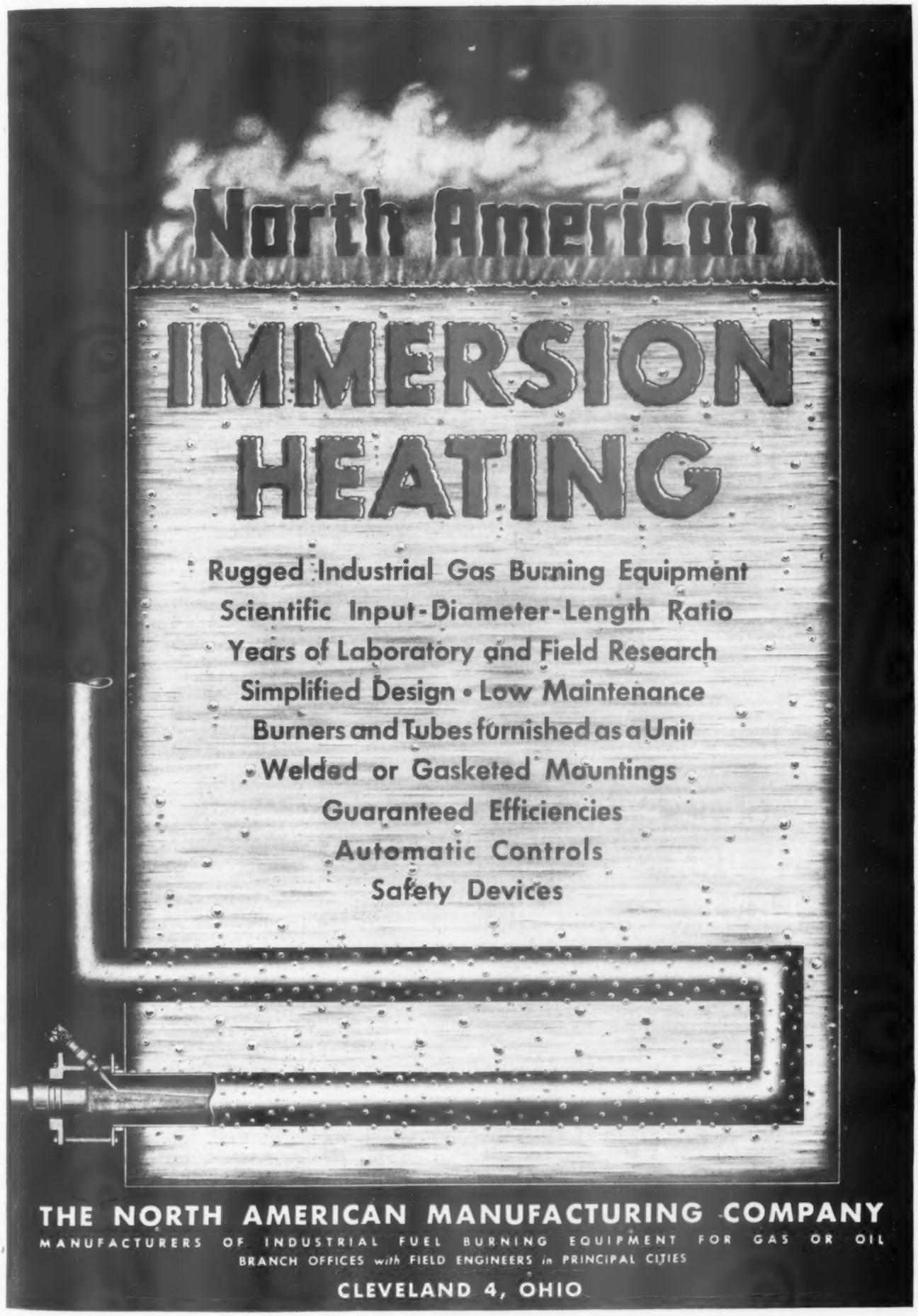
Ashton takes the view that Darby was by no means the first to adopt sand casting and that it seems probable that the shape of bellied pots had hitherto presented an obstacle to the use of sand instead of the more tenacious loam. In a letter written by Abiah Darby, the wife of Abraham Darby's son, in or about 1775 and reproduced by Ashton, it is stated that "it was my husband's father, whose name he bore (and who was the first that set on foot the Brass works at or near Bristol) that attempted to mold cast iron pots in sand instead of loam (as they were about to do which made it a tedious and more expensive process) in which he succeeded. The first attempt was tryed at an Air Furnace in Bristol.

"These were beneficial discoveries, for the molding and casting in sand instead of loam was of great service both in respect of expense and expedition. And if we may compare little things with great as the invention of printing was to writing, so was the molding and casting in sand to that of Loam."

Later in the year 1758 a patent due to Isaac Wilkinson, the father of John Wilkinson, refers to a method of casting guns or cannon, cylinders, pipes and sugar rolls. An extract from this document reads as follows:

"The outside or cope of the mould or moulds in which the guns or cannon, fire engines, cylinders, pipes and sugar rolls

(*Concluded on page* 210)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Ruddy No.	Size	Frazer Equiv.	Net Price
3	¾ x 2⅛"	1-6	.07
5	1½ x 3⅛"	7-9	.12
6	2¼ x 3⅞"	10-13	.17
7	2⅞ x 4⅛"	14-16	.30
8	3¼ x 5⅛"	17-18	.40
9	5⅛ x 5⅞"	19-20	.75

(Tapping holes 4 cents per plate extra)

Ruddy Type Rapping Plates are designed with heavy lugs which form a substantial anchor that greatly reduces the chance of working loose even with extremely heavy pounding. Heavy screws still further reinforce these plates. Installation is quick and simple. Holes are not tapped unless so specified.

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CLEVELAND 3, OHIO

(*Concluded from page* 208)

is or are intended to be cast must be made of sand, mixt with a little horse or cow dung or any other thing to make it porous. This sand is made wett and then rammed up, the patern, being first put in iron boxes made for that purpose of two, three, four, five or any number of parts or pieces. As the nature of the instrument to be cast requires; then the boxes are to be taken asunder into pieces and the patern taken out; then the sand in the boxes is dried in a stove and, when dry it must be blacked or faced with some wet charcoal dust; or black lead or any other mixture or thing to make the same come off or apart from the metal when cast. The insides or cords of all the different instruments abovementioned are made with iron bars either hollow and full of holes, or solid and traced and fluted, and if the bore is large it may be made of bricks walled and the bars of iron or bricks are to be wrapped round with rope made of hay or straw, to take the air off, and must be then covered with the proper thicknesses of the said sand and then dried and blacked as before directed; and then the moulds are put together."

Introduces Sand Molding

This description of the sand, its ramming up and the use of multi-parted boxes appears to be the earliest record in the *British Patent Journal* of dry sand molding technique as distinct from loam molding. The fact that this technique was the subject of an application and grant of a patent is an indication of the novelty of this method at that time, 1758. The records of the activities of Darby along with this lend support to the view that sand molding technique on the lines as we know it today was introduced into England during the first half of the 18th century, 1700 to 1760. Whether this knowledge and these methods were in use on the continent in Holland in particular before this time is uncertain. In so far as Darby is concerned it is on record that he brought back from Holland skilled workmen to his factory in Bristol. However, in spite of the great antiquity of the foundry industry it appears quite probable that the age of green and dry sand molding technique as we understand it today is something like two to two and a half centuries.

Opens Branch Office

General Blower Co., of Chicago and Morton Grove, Ill., which has handled representation previously in Pittsburgh through a sales agency, has opened a branch office of its own in the Bessemer building, in that city. John J. Homan, from the factory and Chicago sales organization, has been appointed manager.

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BY PAT DWYER
Drawings By RICHEY

FOR THE past several years our modest little cot has been getting more noisy every succeeding Christmas Eve. The little old woman who lived in a shoe, and had so many children she did not know what to do, was only a piker, an amateur. I should like to see a sequel to that story dealing with the period when the house—pardon me, the shoe—was filled with grandchildren.

Possibly no author up to the present has felt equal to the task, the younger members of the writing craft for lack of actual experience, and the exhausted older members through realization that the job is impossible.

Some of thse sage and sober reflections passed through my mind on a recent occasion while enjoying a final good night pipe in an old chair in the chimney corner. A number of willing deputies cleared away the mountain of cardboard boxes, ribbons and tissue paper scattered all over the floor in volume closely resembling the aftermath of a fire, a tidal wave, a typhoon and an atomic bomb. Memories of other Christmas Eves extending back over a period of many years, by a peculiar mental twist led me to attempt to peep into the future. Prolonged silence on my part prompted Bill to remark rudely that if I intended to sit there like one of these here now Buddies or a Trappist monk with a face as long and as crooked as a French fiddle, I had better lap my saucer of warm gruel and toddle off to my little barrel in the attic.

"My dear young fellow," I said, "just reflect for a moment. In the ordinary course of events the days of a man's years slide away so quietly, he does not realize how closely he is approaching the jumping-off place. Here is probably one of the most important events in a man's existence, and yet it is something that hardly ever comes to mind. Instances are on record of supercautious individuals who made plans contingent on their exit. Advertisements of funeral homes decorously direct attention to their facilities and—er—terms. Monument makers dwell on the beauty and permanence of their product. Even the cemeteries point out the many attractive features designed, presumably, to influence you and me and the rest of us. And you and me and the rest of us deliberately ignore all these friendly messages and drift along as merry as the rug-cutting grasshopper mentioned in a tidy volume compiled by the late Mr. Aesop, and still listed as a best seller after 3000 years, more or less. Clearly this is a suitable occasion—"

"This is a suitable occasion for me to fold up the tent like them there what do you call 'em birds of the desert or ships of the desert—"

"Arabs."

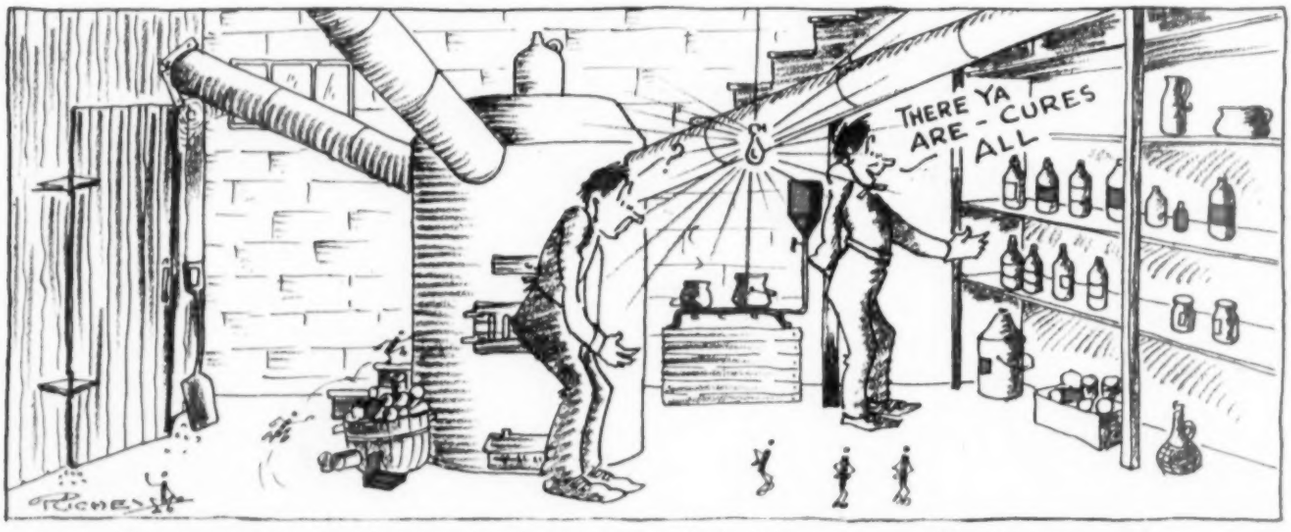
"Kee-rect! Ae-rabs. Should be A-robs. Always stealing something. Each woman's face is concealed behind a veil. Every horseman with the reins between his teeth, a long, crooked sword in one hand and a gun in the other, has his face concealed behind a big, black, bushy beard."

"You left out broad, also bristling, barbaric and beaver from that alliterative attempt."

"Left out nothing. The broads wear veils. Seems to me there is a promising field of exploration for a scholar seeking a thesis to support this claim to an advanced degree. He might title the noble effort: *A Note on the Probable Connection between the Arab Veil and the Custom of Wild North American Indians and Modern Women of Covering the Face with Daubs of Paint.* What do you think of that for an idea?"

"If you take the advice of a true friend—which of course you won't—if you take the advice of a true friend you will keep away from a topic that is filled with dynamite. Man in his superior wisdom may smile discreetly up his sleeve at some of the pathetic paint jobs, but unless he is packing up for a prolonged visit to a cave in the hillside, or a hut on a desert island with a goat and umbrella, he will do well to step warily and stop, look and listen before referring even casually and slyly to barber poles, butcher shops and totem poles."

(*Continued on page* 214)

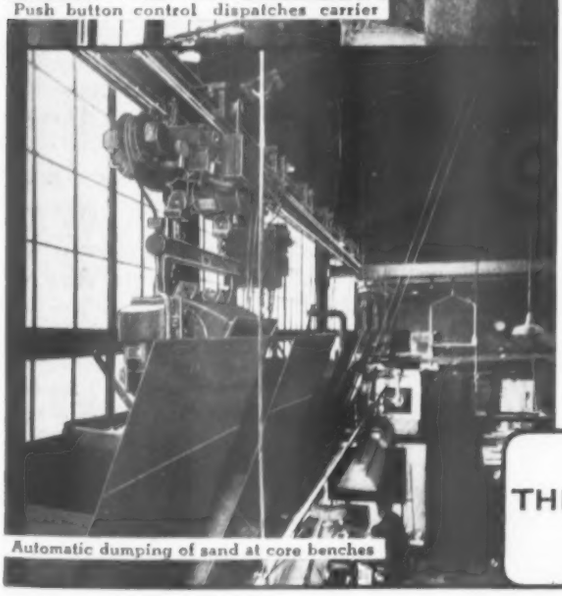


The googum cured everything including large lumps on the head from contact with low hung furnace pipes

Automatic MONORAIL System

Loading bucket at speedmuller

Push button control dispatches carrier



Automatic dumping of sand at core benches

DELIVERS CORE SAND TO 9 STATIONS

FROM a simple push button control, operator of speedmuller keeps nine core makers supplied with fresh core sand at all times.

This system operates as follows — Self-dumping bucket is lowered to floor at speedmuller to receive core sand. Operator raises bucket with twin hook hoist, sets the station selector and then presses starter button. The unit runs to the proper station and stops — bucket makes complete revolution dumping sand in hopper — whereupon the unit returns to loading station. All this operation occurs automatically, with no further attention from operator.

This is just another of the many automatic systems designed by American MonoRail Engineers using the American MonoTractor. Let us tell you more about this rubber wheel drive unit. An engineer will consult with you without obligation.

THE AMERICAN MONORAIL COMPANY

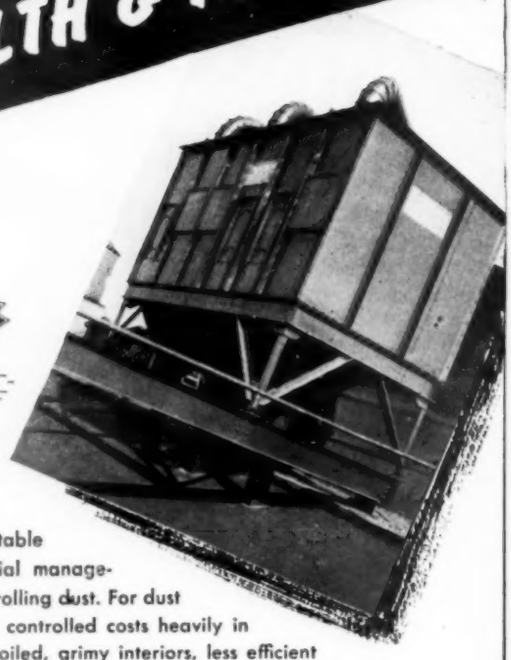
13104 ATHENS AVE. ● CLEVELAND 7, OHIO

MAKE A BUSINESS OF

CONTROLLING DUST...

TO SAFEGUARD

HEALTH & PROFITS



One of the most profitable practices that industrial management can have is controlling dust. For dust that *isn't* scientifically controlled costs heavily in reduced production, soiled, grimy interiors, less efficient lighting, high housekeeping costs, lowered workers' efficiency.

Pangborn engineers, backed by 41 years experience in designing, building and installing the proper dust collecting equipment, have made hundreds of plant surveys of dust conditions in many different types of manufacturing plants. For a soap manufacturer, for instance, where the nature of dust is soap powder, the recommended Pangborn Dust Collecting Equipment has a dust salvage value of $250 a year, assures proper sanitation conditions and reduces plant maintenance costs. For another manufacturer, where the nature of the dust is metallic, the recommended Pangborn Dust Control System saves the company over $8,000 a year.

May Pangborn Engineers—at no cost or obligation to you—make a survey of the dust conditions in your plant? Just write.

PANGBORN

WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST COLLECTING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

(*Continued from page* 212)

"Well," Bill admitted handsomely, "maybe you are more than half right. Criticizing the ladies is good for nothing except usually a session in the dog house. Reference to beards some time back reminds me of a man I ran into about a year ago at a meeting in Montreal. In our younger days we had done a bit of toiling together in a steel plant. Naturally, at this get-together session we dredged up incidents and characters, mellowed and maybe slightly exaggerated by time and distance. For one thing he asked me if I remembered the winter all the melters in the open hearth allowed their beards to grow. I don't know who started the fad, but before the winter was over an outside visitor easily could imagine he was gazing upon gangs of pirates, burly ruffians ashore for a carouse after a more or less profitable cruise on the Spanish Main.

"The beards ranged in color from a light buff to absolute black, and in texture from scattered patches of fuzz to a bush that would fill a bushel basket. If any person had thought of a contest, first prize undoubtedly would have been awarded to Jim O'Hara, melter on No. 1 furnace and a lineal descendant of one of the ancient kings of Ireland. The royal prerogatives, characteristics, rights and privileges had run pretty thin in the intervening centuries, but the main distinguishing mark of the old warriors, a great red or black beard extending from the eyes to the emerald belt buckle, still showed up in all its glory. Envious rivals on other furnaces secretly started a low, malicious whispering rumor claiming that Jim cultivated the bush by daily application of a mysterious liquid compounded at home in his spare time. Started first as a kind of hobby, Jim gradually had carried on a fairly profitable side line in the preparation and sale of an ointment used freely around the mill for application to cuts, bruises, burns, scalds and—as the announcement modestly stated—*Any or All Abrasions of the Epidermis.* He calmly ignored the rumor about beard irrigation.

"He was a solid, substantial citizen who patterned his behavior to a great extent after the owl who lived in an oak. The more he heard the less he spoke. The less he spoke the more he heard. Wasn't he the wise old bird?"

"Where did you pick up that gem of poesy? Pon my word, with the way everything is going lately I shall not be surprised some day to learn that you are a member in good standing of Local 218 National, Benevolent and Protective Union, Poetry Makers of North America. One of these days you may be able to edge into the job of business agent and

(*Continued on page* 216)

LEADING
the way back...

Just as they have helped assure victory in war, American business papers are now helping lead the way back to greater achievements in peace.

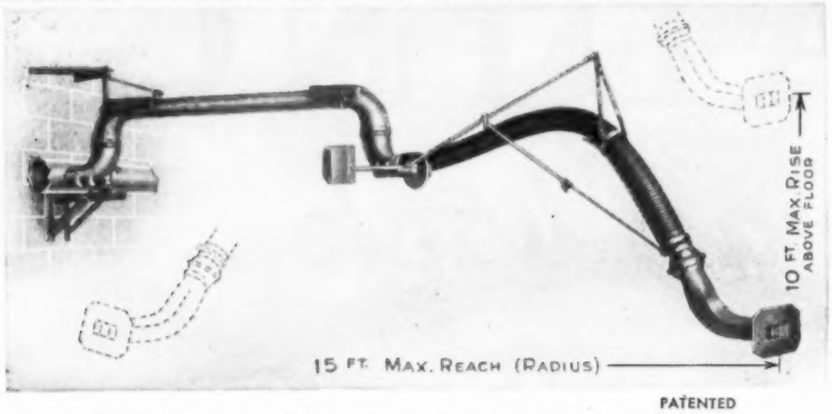
From the pages of American business papers—*like the one you are reading now*—you have learned much to help you through the trying days of war. From these pages you can now learn much that will help you make the transition from war back to peace with the least loss of time, effort and profit.

Your business paper editor is your experienced counsel. He knows your problems. Discuss them with him. It is his business to help you solve them. Read your business paper regularly and carefully because the business paper reader is a better business man.

One of a series of messages prepared by the Business and Industry Department of St. Joseph's of Indiana, college for men, at Collegeville, Indiana.

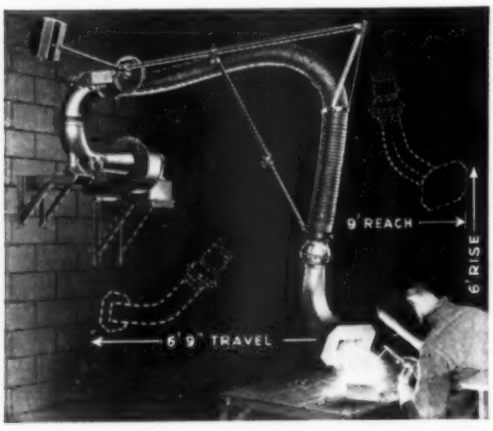
RUEMELIN Fume Collector

REMOVES WELDING FUMES *at the Source!*



PATENTED

LONG REACH MODEL D-5342 — Ideal for large welding booths. Hood reaches out 15 feet from wall. Swivel joints permit inlet hood to revolve in 360° circle for access to all welding positions. Recommended for welding shops having a wide variety of work.



STANDARD MODEL D-5310

Used for standard welding booth ventilation. Hood reaches out 9 feet from wall. A real necessity, especially during winter months when doors and windows are closed.

PATENTED

● Install Ruemelin Fume Collectors to solve your fume removal problem in the most satisfactory manner. Noxious gases, smoke and fumes are drawn away *at the source.* Check these exclusive features:

1. **Guards employee's health against fumes — less welder fatigue.**
2. **Clears shop air with minimum building heat loss.**
3. **Exhaust hood instantly positioned, without using troublesome devices.**
4. **Hood covers maximum welding area, vertically, horizontally and by circle swing.**
5. **Hood equipped with swivelling ball-joint.**
6. **Small amount of electric power used.**

Thousands in daily service in progressive welding shops, metal working plants, railroad repair shops, foundries, structural steel plants, etc. Repeat orders received from many satisfied users. Collectors are available with individual exhaust fans, or with one large fan for multiple collector installations. Engineering data and directions for installing, furnished with each order. Write for Bulletin 37-C and prices.

RUEMELIN MFG. CO.

3850 NORTH PALMER STREET MILWAUKEE 12, WISCONSIN, U. S. A.

MANUFACTURERS AND ENGINEERS

SAND BLAST AND DUST COLLECTING EQUIPMENT

A 4931-2/3

(*Continued from page* 214)

then you can pull the boys out on strike. Why should poets remain in the background when every organization in the land in clamoring for recognition, collective bargaining, shorter hours and more pay? Here is a chance to right a grievance in existence for over 2000 years, the nefarious practice of writing poetry according to the hexameter standard, six feet to the line. A delegation with all expenses paid should be sent to Washington to lay down an ultimatum: Either knock one foot off the line, or put an extra man on the job!"

"Wait a minute," Bill interrupted, "you got me all wrong on this thing. I did not invent or write that rhyme about the wise old owl who lived in an oak tree. Postal zone or other address unfortunately unknown. With the wonderful and flattering faith of children, this hunk of home work was tossed into my lap by a charming little lady who had been requested by her kind and ever loving teacher to parse and analyze the thing. She might just as well have asked me to give her a Choctaw translation. I am afraid the seed of unbelief was sown in her mind. Ten years from now, maybe in five or six years she will be handing me information and advice, instead of asking for anything along that line. With your gracious permission, kind sir, we shall throw the owl and the oak tree and all the other junk in the ash can and return to Jim O'Hara.

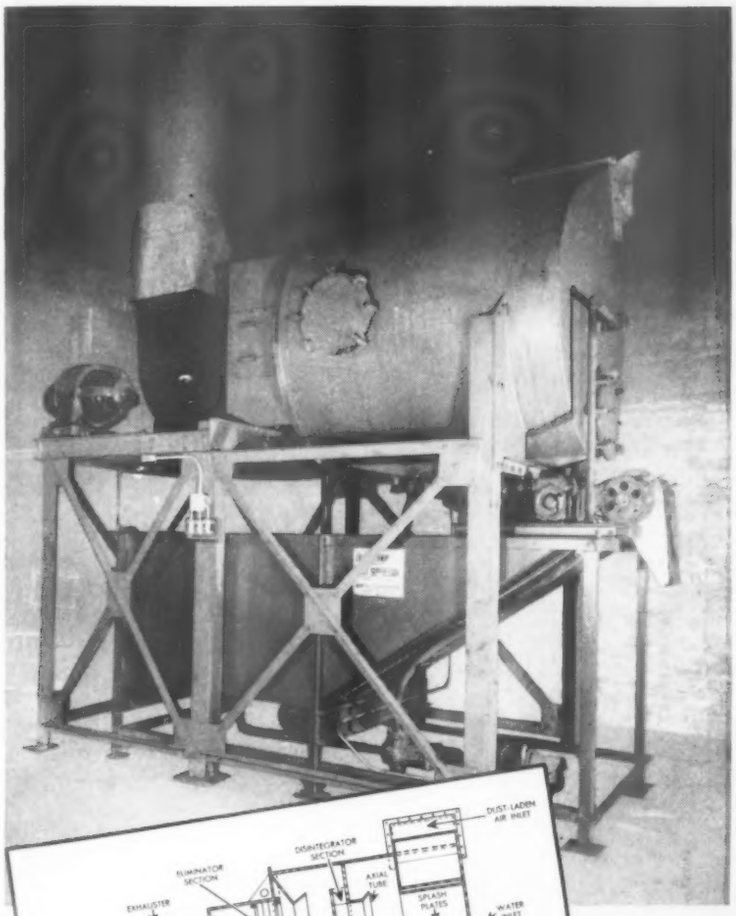
"He built a house and raised a family and on Sunday—looking more like a pirate than a pillar of the church—he took up the offertory collection. Finally he retired from the open hearth and devoted all his time to the compounding and sale of the magic ointment known as *Kuruquick,* spelled K-u-r-u-q-u-i-c-k and based on a formula developed by the last of the great Indian medicine men before he departed for the happy hunting grounds, where presumably remedies of any kind were not required.

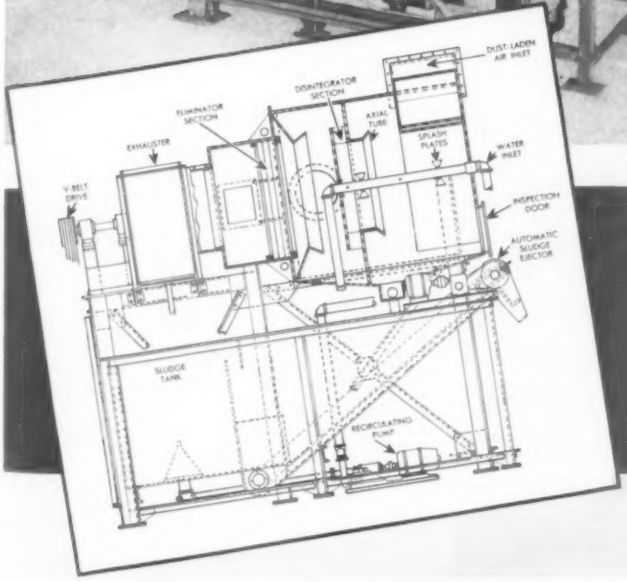
"Confidentially, he admitted to this friend of mine that this Indian medicine man stuff was a happy invention of his own. For many years the pitiful remnants of a once extensive tribe have lived on little reservations. The only medicine they knew was an occasional shot of epsom salts or castor oil from a drug store in the nearest town.

"Positively amazing, he claimed, the manner in which people, supposedly intelligent people, fall for a smooth and oily medical story. He took this friend of mine—let's call him Angus because that is not his name, but it will serve—he took Angus down into his basement and showed him shelves and shelves of small squatty glass jars, all

(*Continued on page* 218)

Suppress dust *completely* with a Whiting Hydro-Clone





The Whiting Hydro-Clone operates on a new and different principle. The dust-laden air swirls through a cylindrical chamber where centrifugal force impinges the dust particles at high velocity against copiously washed surfaces.

The resulting sludge settles out in a dewatering tank, and the water can be used over and over again. There are no cloth bags or screens to burn or wear out, and no nozzles to clog. Sludge tanks can be arranged for mechanical ejection if desired.

Hydro-Clones are engineered for a wide variety of applications—snag grinders, sand blasting, tumbling mills, sand handling equipment, shakeouts. Also used to suppress sparks and fly ash from stacks and cupolas. Write today about your dust problems; descriptive literature on request. Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois.

WHITING
CORPORATION
HYDRO-CLONE DUST SUPPRESSION EQUIPMENT

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, and Washington, D.C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 136 Liberty Street, New York 6, New York.

HAUSFELD FURNACES

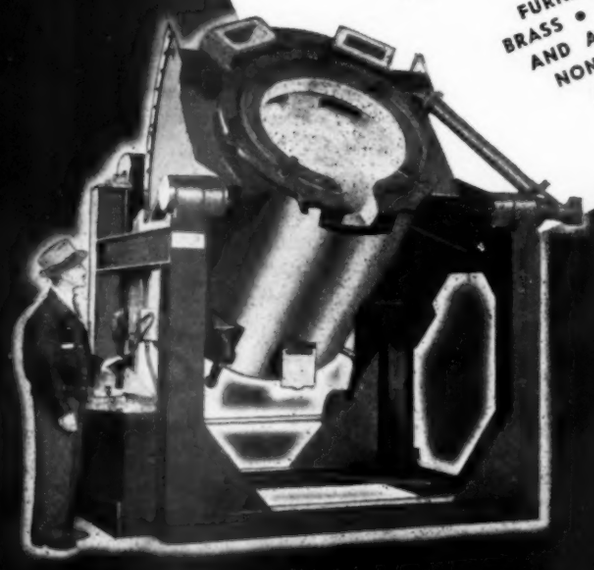
MAGNESIUM MELTING

HAUSFELD FURNACES SUPPLY THE DEMAND FOR BOTH LARGE AND SMALL UNITS FOR OIL AND GAS FUELS

ILLUSTRATION SHOWS 1700 LB. CAPACITY FOUR BURNER GAS FIRED MOTORIZED NOSE TILTING FURNACE

STATIONARY SIZES FROM 100 LBS. UP

FURNACES FOR BRASS • ALUMINUM AND ALL OTHER NON-FERROUS ALLOYS



The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 216)

brilliantly colored. The jars in each section differed in color from the jars on either side. The place resembled a rainbow, or a page from a paint maker's catalog.

"'See what I mean?' he said, 'the very same identical stuff is in every bottle, but each group bears a different label. Green for coughs, colds, sore throat and all diseases of the respiratory organs; red for that tired feeling; yellow for breaks, sprains or twists; violet for loss of appetite; blue for frost bite, sunburn and insect stings; orange for practically anything not listed in the foregoing presentation. By putting the stuff in different colored bottles, each customer thinks he is getting a mixture specially compounded for his particular benefit. You would be surprised if I was to show you testimonials from grateful patients all over the country. How

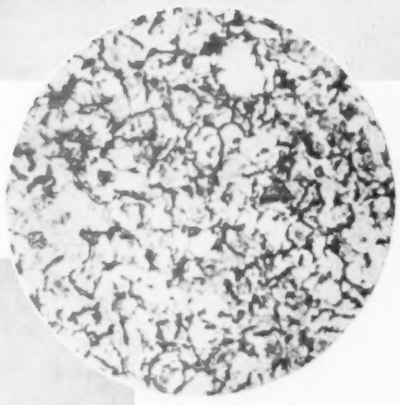
Who will be the lucky one?

would you like to try a bottle? Anything wrong with you inside or outside, lame back, loose teeth, weak eyes, deafness, heat flashes, spots before the eyes, insomnia, botts, housemaid's knee, athlete's foot, running nose? The stuff will cure anything inside or outside—if your faith is sufficiently strong.' Angus carried away an orange colored bottle for a souvenir, but regretted that up to the time of our meeting he had not put it to the test.

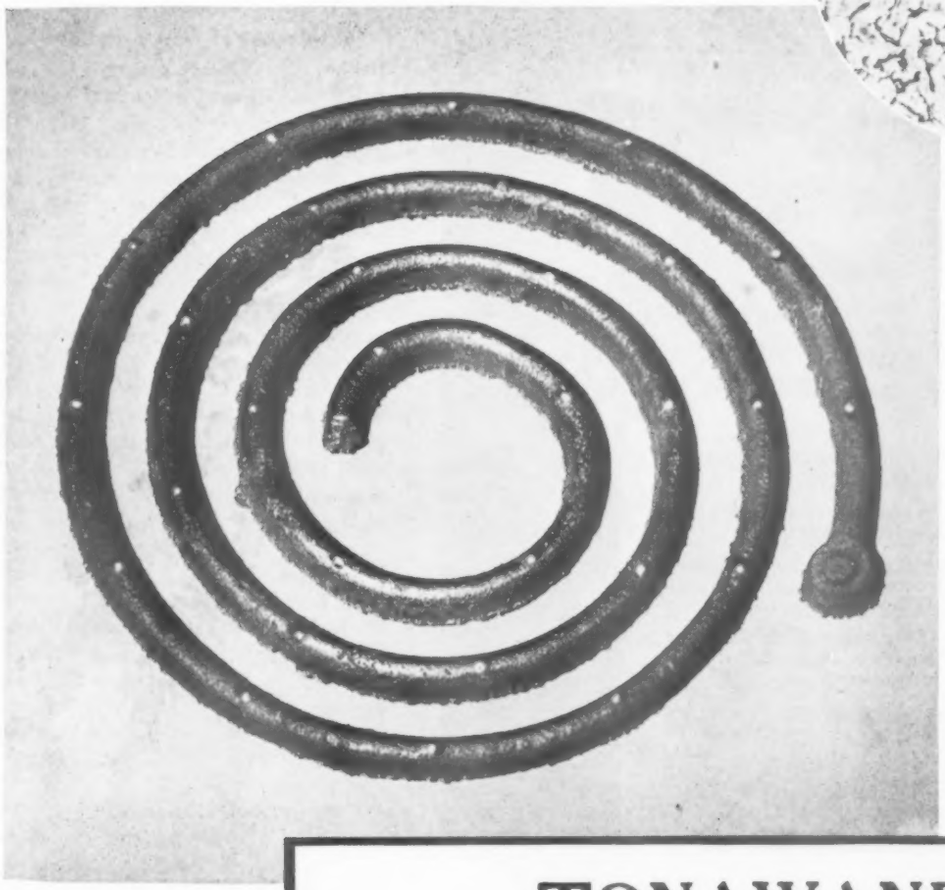
"Talking about faith and so forth," Bill continued, "I had an inquiry some time ago from a man who was considering a proposition to establish a nonferrous foundry in Texas to supply brass, bronze and aluminum castings to the oil fields. He wrote that he was experienced in iron and steel foundry practice, but was not familiar with the nonferrous metals. Could I suggest a book covering

(*Concluded on page* 220)

G-IRON* gives you greater fluidity



*G-Iron is graphitized pig iron. The photographs show its grain structure. The photomicrograph (circle, etched, 500 diam.) shows the random graphite evenly distributed. Manufactured under U. S. and Canadian patents.



Standard fluidity test of a G-Iron casting, containing 2.08% silicon, 3.56 total carbon, measures 52 to 59 inches compared with ordinary iron which flows from 30 to 40 inches.

Greater fluidity of G-Iron and reduction in internal shrinkage help solve the problem of casting thick and thin sections without the danger of cold shuts and shrink pockets. Reduces scrap losses.

TONAWANDA
for sound castings

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

(*Concluded from page* 218)

nonferrous foundry practice in detail, molding, coremaking, melting, cleaning, metal mixtures, etc.

"I wrote him that up to the present the most complete and detailed description of brass foundry practice appeared in THE FOUNDRY in a series of articles by N. K. B. Patch. The first article in this series was presented in the January, 1935, issue and the last January, 1944. *Casting Manual, Nonferrous Metals,* by Sam Tour, 52 pages, covers the subject in a concise manner. An exceptionally well written paper, "Problems in Nonferrous Foundry Practice," by W. B. George, appeared in the October, 1940 issue of THE FOUNDRY. *Cast Metals Handbook,* published by American Foundrymen's Association, contains a section devoted to the nonferrous metals, chemical and physical properties, tests, specifications and compositions.

"Incidentally, I pointed out that since he had not asked for it he might resent certain advice prompted solely by altruistic motive. Unless this proposition of his has several extraordinarily favorable features, I think he would be well advised to stay away from Texas and away from the brass foundry. While the basic principles of all foundries are alike, the technique and methods of manipulation vary to a considerable extent between ferrous and nonferrous foundries. Even though he is a highly accomplished iron and steel foundryman, his skill and knowledge would avail little in the solving of a knotty nonferrous problem. Another point to be considered is that the field he proposes to enter, the oil field, is one of the most highly specialized in the world. The only acceptable castings are those showing physical properties in excess—if that is possible—of absolute perfection. Meeting oil field engineering requirements and specifications is a job for a highly skilled and widely experienced expert nonferrous foundryman."

MADE OF ASBESTOS
They can't corrode!
Transite Core Plates have *all* these important advantages:
Light Weight—Easier to handle, permits heavier loads.
Less Breakage—Fibrous asbestos-cement structure resists shocks, minimizes cracking and breaking.
Easily Cleaned—Both sides usable. In the oven, core washes burn off the underside.
Economical—Low price, low upkeep, long life . . . cost less in the long run.
Low Warpage—less than 0.1%.
Corrosion Resistant—because of asbestos-cement composition.
Perforated Plates—also available, to eliminate green cores and reduce baking time.
JM
Johns-Manville
22 E. 40th St., New York 16, N. Y.
TRANSITE CORE PLATES

MOLD CAVITY VARIATION

(*Continued from page* 91)

similar materials act generally as mold stabilizers. If used in minimal quantity, their gassing effect is nil. When the quantity of the material is raised above the amount actually required, there is a sharp reduction in fluidity of the sand. Unless ramming is increased proportionately the mold cavity will show a strong tendency to enlarge. This is especially true of heavier sections.

Pitch: Pitch is a complex agent. It generates large volumes of gas, but it is also thermoplastic. On light green sand work pitch will generally tend to form a gas cushion and reduce the size of the mold cavity. The factor of permeability is critical, however, and the combination of high permeability and hot metal may allow the mold cavity to enlarge. In heavy green sand molds, the pitch will show a pronounced tendency to enlarge the mold cavity. It is sometimes desirable to incorporate pitch in sand which is subject to fines build-up. The lesser quantity of pitch, as compared with seacoal, reduces the percentage of fines, and also tends to reduce the adverse effect of the fines.

Seacoal: Seacoal is extremely effective in reducing the volume of the mold cavity, particularly in the cope, and its effect can be observed even on very heavy castings. The degree to which it acts depends, of course, on the volume of seacoal present and on the permeability of the sand when heated. While it acts, theoretically, either to provide a gas cushion, or to close the interstices of the sand with gas under pressure, the rapidity with which the gas moves from the bottom of the mold cavity to the top

(*Concluded on page* 222)

ROURA
SELF-DUMPING
HOPPERS

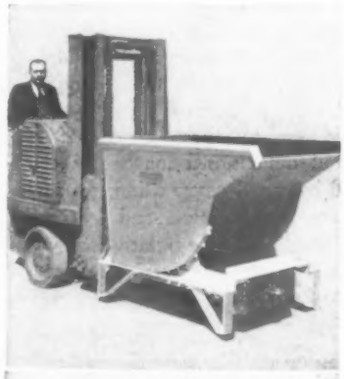
- REDUCE FATIGUE 50%.
- CUT WASTEFUL MANUAL WORK.
- ENGINEERED TO DUMP . . . SAFELY.
- INCREASE FLEXIBILITY OF MATERIAL-HANDLING.

STANDARD
1 Cu. Yd. Unit
$100, FOB, Detroit

THIRTY-DAY
TRIAL BASIS

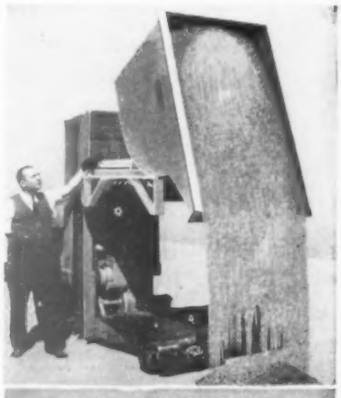
● ONLY ONE MANUAL OPERATION . . . Push release lever and the Roura Self-Dumping Hopper empties, returns to loading position and automatically locks. Built of all-welded, heavy steel for long, rugged use . . . with hot or cold materials . . . for either platform- or fork-type lift trucks.

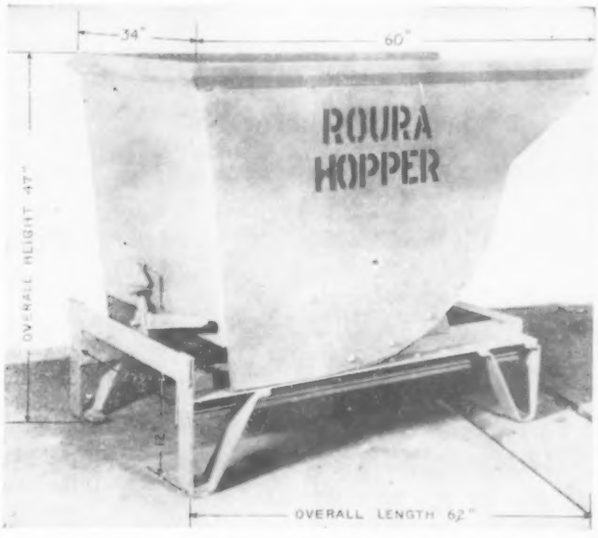
Foundries and shops IN EVERY STATE OF THE UNION use the ORIGINAL SELF-DUMPING HOPPERS . . . engineered by ROURA.



● (Left) Easy to pick up from any level. Fits securely on truck when raised.

● (Right) Dumps safely at any level. Fork-type base shown lower right, platform type in center.





● (Above) The Standard (1 Cu. Yd.) model of the Roura Self-Dumping Hopper, showing over-all dimensions and base for platform-type lift truck.

ROURA IRON WORKS

1405 WOODLAND AVE. **DETROIT 11, MICH.**

(*Concluded from page 220*)

sometimes leads to undersize copes with a normal, or dirty, drag. If seacoal content is adjusted to the permeability of the sand, and the moisture is properly controlled, seacoal will cause no dimensional difficulties. It acts generally as a stabilizer.

Bonding Clay: Clay has a great deal to do with mold cavity enlargement. Sigerfoos and Womochel described its effect in part in 1941. Western, swelling bentonite contributes strongly to mold cavity enlargement. Fines are not entirely effective in reducing the yield of a swelling bentonite sand. Freedom from shrinks and porosity, and oversize castings, can best be achieved by very hard ramming and high mold hardness. Kaolinite, which is used in larger percentages than bentonite, will show some tendency to yield under the pressure of the metal, but to a much lesser degree than swelling bentonite. The best results with kaolinite are probably achieved with a sand of relatively uniform grain, a somewhat smaller percentage of fines than with bentonite, and with adequate facing material.

Southern bentonite, which is non-swelling, and is used in small quantities, appears to show the least tendency of any bonding clay to mold cavity enlargement. When used to replace a part of the western bentonite in the sand it will reduce the yield. Although southern bentonite appears to offer the greatest advantages in dimensional stability, it lacks sufficient dry and hot strength to serve by itself as a universal bond. The mold cavity will change in volume with changes in the quantity or type of clay used.

Mulling: If the mulling cycle is not long enough to develop the optimum strength of the clay, it may be necessary to use an excess of clay. Such an excess of clay will lead to wide variations in the size of the mold cavity. Obviously, the remedy is to mull the sand without clay additions.

In general, when light castings are oversize and the sand is at fault, it will be due to excessive permeability, insufficient fines, type or quantity of clay, or to very low moisture content. Shrinks in small castings may also be caused by the same factors. Light castings may come undersize when the facing material additions are too large, or the permeability low, or by an excess of moisture.

On heavy castings a small mold cavity may result from an excessive accumulation of fines, or from an excess of gassing agents coupled with low permeability. An enlargement of the mold cavity of a heavy casting may be caused by an excess of pitch or organic binder, or by an excess of moisture, by a deficiency of fines, or by the type or quantity of clay.

In addition to these sand factors shrinks and dimensional inaccuracy can be caused by metal composition, pouring temperature and practice, and by poor molding practice. The relative importance of any of these factors varies from foundry to foundry.

Finding the CAUSE—
suggesting the CURE
for DEFECTIVE CASTINGS

...ours is the business of helping YOU

KAWIN SERVICE includes advisory and consulting assistance on every phase of general foundry practice. We invite your inquiries.

LABORATORY SERVICE

Our laboratories offer you prompt and accurate service on chemical and physical testing of all ferrous and non-ferrous metals, sand, coal, coke, fluxes, etc.

SERVICE TO FOUNDRYMEN SINCE 1903

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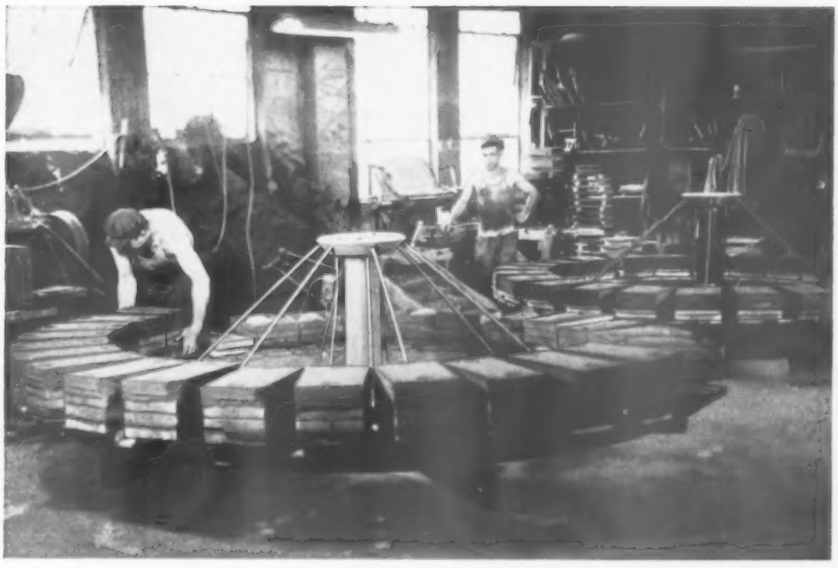
Foundry Training of Students Planned

Under a three-year agreement between the British Columbia Industrial and Scientific Research Council and the School Board at Vancouver, B. C., Canada, a joint committee will study plans for training 15 to 20 students a year for the foundry industry. An experimental foundry will be set up at Vancouver Technical School, expenses being shared by the two groups. The metal trades section of the Canadian Manufacturers' Association recommended establishment of the experimental foundry to make available an adequate supply of young, well-trained personnel. It also recommended a night school course for advanced training.

The New . . . ROTO-CAST Revolving Mold Conveyor for Nonferrous Foundries



Increases mold production . . . saves labor . . . reduces handling time . . . Speeds output . . . Comes ready for quick, easy installation . . . !

3 Sizes

ROTO-CAST is made in three standard sizes: 10-ft., 12-ft., and 14-ft. diameters.

Full roller-bearing construction for easy turning. When desired, release of ratchet makes free-wheeling. Can be rotated with one finger even when fully loaded. No motors or other operating cost.

Patent Applied For

ROTO-CAST

* Designed by foundrymen under actual working conditions, ROTO-CAST conveyors are in use in representative foundries . . . have proven their unusual merit and efficiency.

Easy to assemble and install, the unit sets on the floor without the necessity of anchoring, thus giving full flexibility. It is placed just back of each molder who simply turns around, places his mold on the conveyor, then steps on a trip ratchet release . . . spring arrangement revolving ROTO-CAST to position for receiving the next mold.

Pouring may be done from one spot as the unit is revolved and stopped positively for the pour. Shake-out is at one spot with molds simply picked off and dumped as machine is revolved.

Its low cost will surprise you.

WRITE FOR FOLDER "F" FOR FURTHER DETAILS

FOUNDRY EQUIPMENT, Inc.

TELEPHONE 510

COLDWATER, MICHIGAN

Brings MECHANIZATION to the Molding Floor at LOW COST

CASTING PATTERNS IN
Phenolic Resins

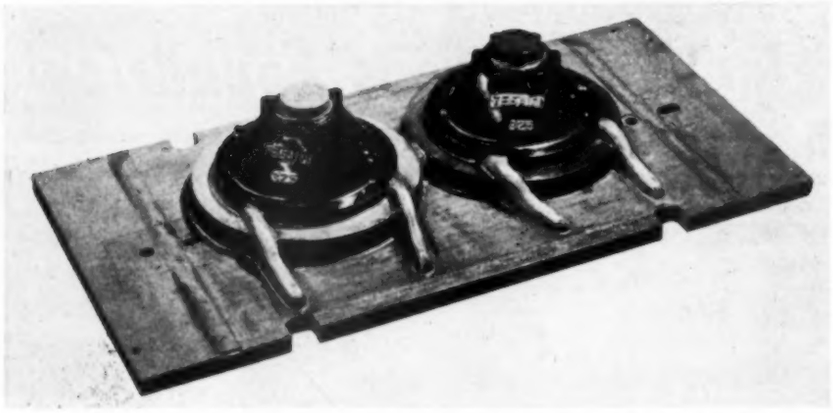


Fig. 1—Cast phenolic resin pattern on the left duplicates exactly the wood pattern at right

By C. R. SIMMONS
Durez Plastics & Chemicals Inc.
North Tonawanda, N. Y.

ABOUT three years ago liquid phenolic casting resins were introduced to the aircraft industry as a material for making forming dies for light metals in a faster and more economical way. Since then the use of these materials has spread rapidly to other industries, and applications of casting resins for coreboxes and patterns have proved successful. Recently one patternmaker, who has been working with this comparatively new method, was approached for his views and experiences.

"One cannot sit still and depend upon experience alone in patternmaking any more than in any other profession," said Martin Pedersen, Bison Pattern Works, Buffalo, N. Y. "That is why I have added plastics in my shop. After many months of work with these new phenolic casting resins, I have been able to provide a far broader service to my customers than if I had relied on metal alone. A couple of interesting applications will explain more fully why I am so keen on these plastics for some jobs.

"About a year ago one of my customers wanted in a hurry a duplicate pattern for a Navy part he was casting. As indicated at the right of Fig. 1, it was suited ideally to be duplicated in plastics. At that time I had had enough experience to be willing to guarantee to him the practicability of a plastic pattern. Not only that, but I delivered it in 24 hours. I picked up the original wood pattern one morning and brought it to the shop. It was in good shape and required no touching up. It was removed from the plate and used to make a plaster mold. After coating this mold with a special paint, which is used as a parting agent for the phenolic casting resin made by Durez Plastics & Chemicals Inc., North Tonawanda, N. Y., the resin was mixed and poured. The plaster mold was made generous in depth to allow some excess plastic on the bottom which could be ground off to provide a perfectly smooth bottom for mounting. This resinous mix or plastic had to set about 4 hours before it could be baked, then the filled mold was placed in the oven which had been heated to the proper temperature, about 140 F, and the time control set for 8 hours.

Reduce Pattern Cost

"The next morning the pattern was removed from the mold. Close checking indicated that every dimension matched the wood original. All I had to do was grind off the bottom, drill a few mounting stud holes, mount it alongside the original which had been mounted the day before, and take it back to the foundry. That duplicate pattern in plastic cost the customer just 12½ per cent of the original pattern cost.

"Here's another example: One of my customers brought in a couple of plates on each of which were mounted 16 small metal patterns. Each one had to be changed slightly. The change required building up at a shoulder to meet a revision in the ultimate customer's specifications. Since the addition of the metal and the machining and finishing would have made a long, hard job, the necessary change was made on one set and then a plaster mold made from the set. I cast the whole 16 sets in casting resin, ground off the flash, smoothed up the bottoms, drilled and tapped each one for fastening studs and pin guides. Only a fraction of the time normally required was consumed and, naturally, the job was completed at a fraction of the cost.

"Another tough job came up recently when a customer brought in an old wood pattern that was all banged up, cracked here and there, chips out some places, a hunk knocked out in another. It would have cost $150 to make a new pattern.

(*Concluded on page 226*)

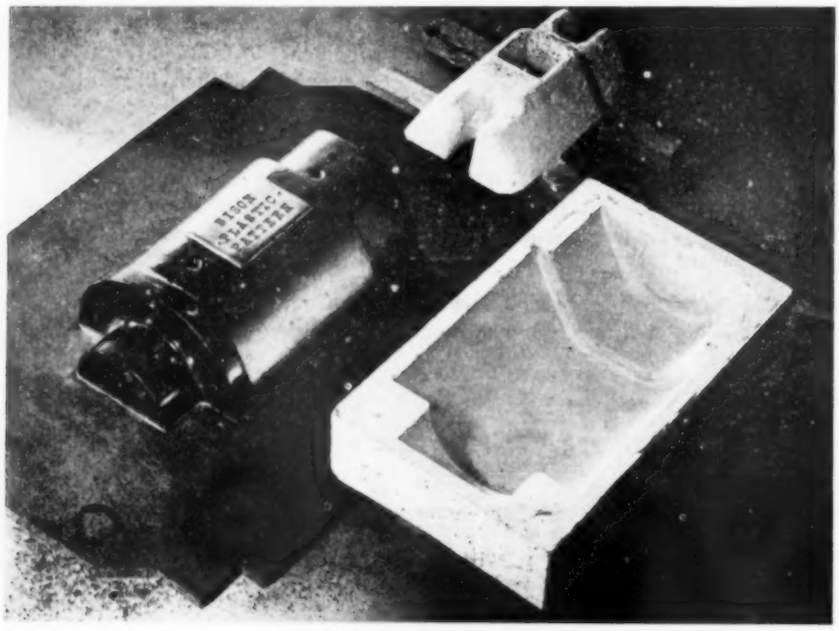


Fig. 2—Typical plaster mold and core used for casting the resin pattern at the left. Use of the core reduced the amount of resin required and the weight of the pattern. Mold and core can be used for producing duplicate patterns

Generating AIR POWER

Four 700-hp PRE Compressors in mining service.

. . . . with I-R COMPRESSORS

The new PRE is the very latest in electric-driven compressor design. Look at the sturdy sealed frame, with its built-in, force-feed and filtered lubrication system, and full-floating crank- and crosshead-pin bearings. Main bearings have micrometer adjustments from the outside of the frame. Since the crankcase need not be opened for adjustment of any bearings, it is sealed, and thus stays clean.

These are the compressors equipped with air-operated, 5-step Clearance Control . . . a system originated and constantly improved by Ingersoll-Rand. This has always been conceded to be the best method of controlling the output of electric-driven compressors.

To generate large quantities of Air Power, choose the class PRE . . . for high over-all efficiency, reliability, low maintenance, and long life. Sizes 300 to 3000 hp. Let our engineers help plan your Compressed-Air Power system.

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COMPRESSORS CONDENSERS • TURBO BLOWERS • CENTRIFUGAL PUMPS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES

(*Concluded from page* 224)

Instead, a plastic pattern was made, the bad places just filled with more casting resin—and only a little finishing was required. The new plastic duplicate was delivered for $25.

"Incidentally, plastic patterns do not have to be shellacked. They do not warp or weather and will stand more rough usage than wood patterns—and they are just about as light in weight."

Chicago Foundry Co., Chicago, suffered estimated damage of $30,000 in a coreroom fire, Dec. 6.

FRENCH FOUNDRY INDUSTRY ORGANIZATION

(*Continued from page* 113)

comprise and their customers. Each group is itself divided into subgroups which deal with customers' orders, prices, designs, etc.

The Steel Castings group covers the following subgroups: railroads, shipbuilding, public works, agricultural machinery, automobiles, mining and others.

The Malleable group covers: railroads, agricultural machinery, automobiles, hardware, etc., each forming a subgroup.

The Light Castings group covers similarly: coal cookers and heating appliances, appliances heated by wood, gas cookers, electric cookers, etc.

The new group for jobbing foundries will come into being only when the subgroups that it will cover have been constituted; some of these already exist and are included in the existing groups; others to come include factory plant and equipment, hoists and handling equipment, etc.

The whole organization is controlled by the Office Professionnel which, through the Commissaire Provisoire or government delegate, decides on the various priorities to be given to contracts and orders. Among the highest priorities at present are: rehousing and reconstruction, transports, domestic heating and mining plant and equipment.

The Syndicat General des Fondeurs is the employers' federation, which protects and defends the interests of its members and conducts negotiations with the government through the Office Professionnel. It was formed in 1918, dissolved by decree in August, 1940, and reformed in December, 1944. It comprises a number of geographical sections comprising nine regions in France, where foundries are mostly concentrated.

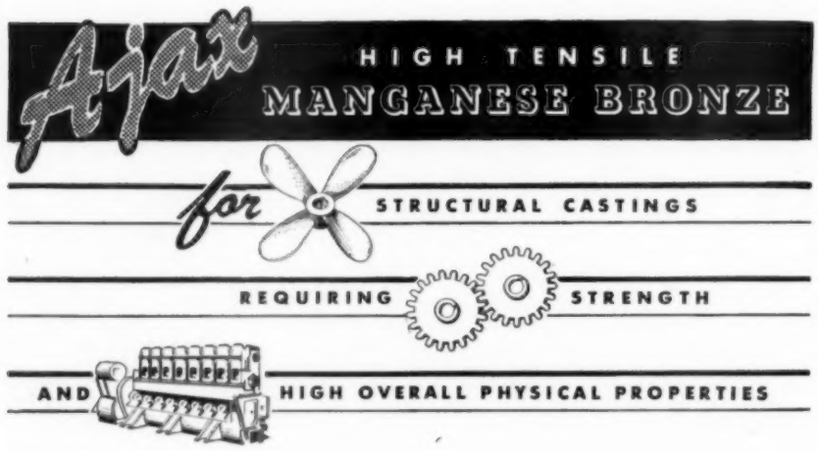
Various Committees Appointed

Superimposed upon this geographical division is a grouping into trades comprising: bronze castings for shipbuilding, aluminum castings, steel castings, malleable castings, light castings (heating appliances), die castings, jobbing foundries, rainwater goods. Each of these groups has its own committee.

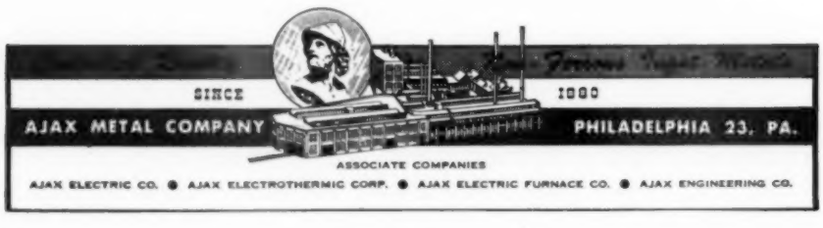
The syndicat is divided into departments each with a specific function and having its own committee. These departments cover legal matters, transport, apprentice training, safety measures and prevention of accidents, co-operative buying, costing, and an editorial department responsible for the publication of the syndicat's bulletin.

As already indicated, the Syndicat General des Fondeurs is a voluntary organization. Firms join as members by paying an annual subscription based on wages.

In 1941 it was found necessary to set up a technical organization to advise what was then known as the Comite d'Organisation (now the Office Professionnel) on matters relating to the raw materials required by the foundries. A technical advisory committee was formed, and it was soon found that its services



Designers and foundrymen, charged with the gigantic responsibility of specifying engineering materials for the products of a world once again at peace, are closely scrutinizing the widest range of selectable materials ever offered to industry. Of primary importance is the direct consideration of Performance; and, decisions thus made must, of necessity today, be tempered with new emphasis on total Cost. An alloy, therefore, which measures high in strength, toughness and corrosion resistance—which has cut its eye-teeth long ago on marine castings and fittings, engine bases, pump bodies, gears, etc.—yet permits the foundryman to produce solid castings perfectly free from surface imperfections and which leave the sand bright and clean—and will take a mirror-like polish —an alloy like that deserves investigation. A metal of such calibre is Ajax High Tensile Manganese Bronze. Produced under rigid laboratory standards to constant formulae, this Ajax ingot has established recognition as the highest quality manganese bronze available. Write for complete data NOW.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ASSOCIATE COMPANIES
AJAX ELECTRIC CO. ● AJAX ELECTROTHERMIC CORP. ● AJAX ELECTRIC FURNACE CO. ● AJAX ENGINEERING CO.

could be used not only to advise the Comite d'Organisation on raw materials, but also to help the foundries in regard to technical problems that confronted them. Consequently, in 1942 the advisory committee was reconstituted and became the "Centre Technique des Industries de la Fonderie," with wider functions and a more systematic organization than the original committee.

During the period of occupation, not only did the Centre Technique deal with problems of the moment; it also considered problems of the future, such as improvements in the metal used for castings, moderization of foundries for postwar operation, standardization of certain patterns and designs for peacetime production.

At first the Centre Technique had an official budget, which was a part of the budget of the Comite d'Organisation. When this latter body was replaced in 1944 by the Office Professionel, the Centre Technique was kept into being and given a more independent status, with its own constitution. The financing of this organization was covered by a decree dated Jan. 16, 1945, which laid it down that the Centre Technique would be financed by means of a special tax levied from the consumers of castings, in the form of an additional 1 per cent on all invoices. One half of this tax is paid in to the fund of the Centre Technique and the foundries are allowed to retain the other half to cover expenditure on their own individual technical research work. Machinery was evolved to control through a government agency that the money retained by the foundries was put to its proper use. Where a foundry does not engage in technical research work the whole 1 per cent tax goes to the Centre Technique.

Assist the Smaller Foundries

Provision has also been made, by setting up regional laboratories, to assist the smaller foundries in testing and controlling their materials and castings. In such cases the foundries that make use of this service contribute their share of ½ of 1 per cent of the tax.

Under its present constitution the Centre Technique des Industries de la Fonderie has a board of directors and a majority of its members are members of the Syndicat General des Fondeurs de France. The president of the syndicate is also chairman of the board of the Centre Technique, the vice chairman being the commissaire or government delegate on the Office Professionnel. The Centre Technique is managed by a director.

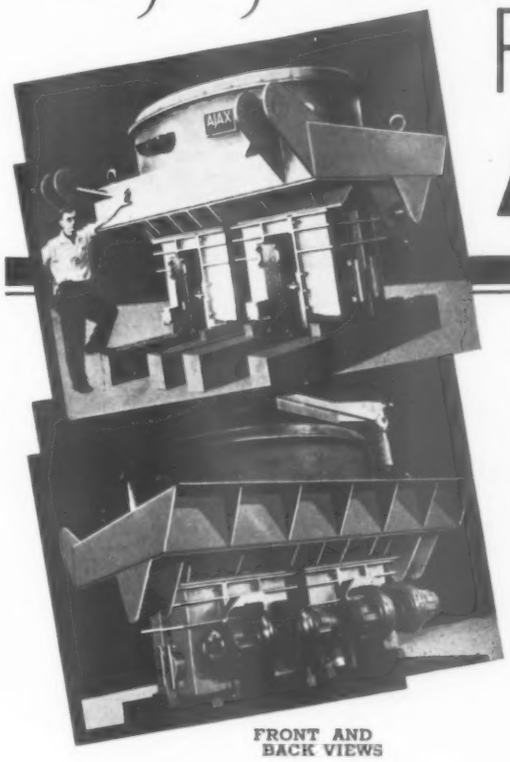
The Centre Technique, which has its own premises, comprises: (a) a technical council, (b) a number of technical departments, (c) an information bureau, which is also in charge of technical publications.

The technical council is divided into a number of committees covering ordinary gray iron, special irons, malleable iron, steel, bronze and brass, light alloys; die castings, castings for coal and coke fired heating appliances, gas cookers, rainwater goods.

One of the technical departments specializes in solving problems with which foundries are confronted, and a number of foundry engineers are available in the various foundry centers who visit the works and get the foundries out of trouble. One department deals with standardization and operates in liaison with the Association Francaise de Normalisation, the French Standards institute. One department specializes in designing foundry layouts and organization.

Another department comprises laboratories equipped for testing raw materials, sand, fuel and castings. A special section is in charge of testing and putting the official stamp on coal-fired heating appliances, which must now satisfy certain minimum conditions of efficiency laid down by the Union des Fab-

Low Frequency INDUCTION MELTING FURNACE by AJAX



FRONT AND BACK VIEWS

THIS unit (the largest of its kind ever made for melting aluminum alloys) is powered with 500 kilowatt three-phase 60 cycles alternating current, melts over 2500 pounds of aluminum alloy per hour and allows to cast ingots up to 6000 pounds individual weight. Tilting is exactly around the pouring spout and casting speed is adjusted within close limits by hydraulic rams with sensitive pump control.

Temperature, of course, is also automatically regulated and there is no chance for overheating the bath at any time during the melting cycle.

● Ajax Tama-Wyatt Induction Furnaces are made in a wide range of sizes to meet the demand for large volume or small special lots of aluminum alloy ingots. Ajax Tama-Wyatt Furnaces can be operated continuously, without frequent interruptions previously necessitated for reconditioning melting channels.

AJAX ENGINEERING CORPORATION
Box 1418, Trenton 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

ricants d'Appareils de Chauffage Domestique, or union of manufacturers of domestic heating appliances. It is proposed to set up a similar section to test and stamp gas cookers. The laboratory department is still in the process of development. It is also proposed to set up a small model foundry, mainly for testing purposes.

The information bureau receives the leading French and foreign publications and edits a bibliography of technical subjects related to the foundry. It proposes to publish a journal, "La Fonderie," which will cover the activities of the Association Technique de Fonderie and of the Centre Technique des Industries de la Fonderie. The editorial committee has Prof. A. Portevin as its chairman and comprises equal numbers of representatives of the foundry association and of the Centre Technique.

The Association Technique de Fonderie dates from 1911 and continued its activities uninterruptedly throughout the two wars. It retains its autonomy in the present organization of the French foundry industry. Its main function is to arrange meetings at which technical papers are discussed by its members. It organizes its annual conventions and is also responsible for international foundry congresses when these are held in France. It will continue to play its part in the publication of the official technical journal in collaboration with the Centre Technique, as explained previously.

Before the setting up of the Centre Technique, the Association Technique had a number of committees, each of which studied various aspects of foundry practice or technique. This function is now fulfilled by the technical committees of the Centre Technique, but the chairmen of these committees are the same as they were under the previous organization, and the president of the Association Technique is ex officio member of the technical council of the Centre Technique. Moreover, a certain number of special committees previously organized by the association, such as the committees of safety and prevention of accidents, apprenticeship, dictionary of foundry terms, etc., remain as committees of the association.

The Office Professionnel de la Fonderie, the Centre Technique des Industries de la Fonderie and the Association Technique de Fonderie each occupies its own premises in Paris and each is within walking distance of the others.

This brake will develop a torque of 575 lbs. ft. or the equivalent of 100 HP at approximately 1000 RPM. Can be supplied in floor or motor mounted type for AC or DC current.

Floor Mounted Brake

Stearns MAGNETIC

BRAKES Stop HEAVY Loads

Up to *100 HP motor driven loads*, depending on speed, can be effectively retarded with Stearns Magnetic Disc Brakes. If you have a problem involving one or a sequence of automatically controlled stops on motors or moving machinery, it will pay you to investigate Stearns Brakes.

The cost is so little, and the usefulness so great in dollar and cents value.
Bring your braking problems to our Brake Division. Stearns Brakes are being used efficiently and satisfactorily in hundreds of exacting operations.

Put them to work for you!

The magnetic brake with the lining wear indicator and manual release—distinctive, original

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PULLEYS — CLUTCHES — SEPARATORS — DRUMS — MAGNETS

FOUNDRY VENTILATION

(*Continued from page* 88)

application in shakeout service as the exhaust air is far removed from the zone of dust generation; cross drafts and convection currents upset its effectiveness; volume of exhaust air is greater than for a side hood; and contaminant is drawn through the breathing zone of the shakeout crew.

Downdraft, as the name implies, is a method of drawing dust, steam and fumes through the shakeout grate by the use of an exhaust connection and distribution manifold in the shakeout hopper. While this method would normally be discarded immediately by the ventilation engineer as an impractical system, downdraft appeals to the foundry operator as it requires no hood construction above the floor level. It gives complete freedom for the shakeout crew, provides no interference for the crane operator. There is no obstruction to be battered by heavy flasks, and flow to and from the shakeout station can be in any direction. These arguments have been further buttressed by occasional downdraft installations that have worked satisfactorily, although such installations are far outnumbered by downdraft exhaust systems that have

(*Continued on page* 230)

VOLCLAY BENTONITE

NEWS LETTER No. 6

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

COMPARISON OF VARIOUS BONDING AGENTS

Leading types of bonds...	Western Bentonite	Southern Bentonite	Fireclay
Commercial brand name....	Volclay	Panther Creek	"Fireclay"
Mineral classification...	Montmorillonite	Montmorillonite	Kaolinite
Mined in.....	Wyoming & So. Dakota	Mississippi	Many States
Method of mining.....	Strip	Strip	Strip, drift, shaft
Average grain size.....	70% finer than 0.2 microns	87% finer than 0.5 microns	70% finer than 20 microns

Note: A micron is about 1/25,000 of an inch

CHOICE FOR USE IN FOUNDRY MOLDING SANDS

	First Choice	Second Choice	Third Choice
Furnishing highest green strength.....	Panther Creek	Volclay	Fireclay
Furnishing highest tensile strength.....	*Volclay	*Panther Creek	Fireclay
Least amount of water to temper correctly	Panther Creek	Volclay	Fireclay
Bond yielding the highest permeability...	*Volclay	*Panther Creek	Fireclay
Furnishes the highest dry strength.....	Volclay	Fireclay	Panther Creek
Supplies the highest fired strength.....	Volclay	Fireclay	Panther Creek
For ready collapsibility at high temp....	Panther Creek	Volclay	Fireclay
For readiness to collapse after cooling..	*Volclay	*Panther Creek	Fireclay
Bond to use for best flowability.....	Panther Creek	Volclay	Fireclay
Bond that gives the highest deformation..	Volclay	Fireclay	Panther Creek
Bond that gives the highest resilience...	Volclay	Fireclay	Panther Creek
Highest refractory bond.....	Fireclay	Volclay	Panther Creek
Highest sand-bond sintering point by method "A".....	Volclay	Fireclay	Panther Creek
Mold is easiest to patch when bonded with	Fireclay	Volclay	Panther Creek
Bond which is less apt to dry out.....	Fireclay	Volclay	Panther Creek

Durability--There are many diverse opinions. Some say fireclay bonded sands, others say western bentonite bonded sands--it depends on the method used. Southern bentonite is lower in durability than the others.

CHOICE OF BOND THAT IS LEAST APT TO CAUSE FOLLOWING DEFECTS

Scabs.....	Volclay	Panther Creek	Fireclay
Blows, porosity, pinholes.....	Panther Creek	Volclay	Fireclay
Washes and cuts.....	Volclay	Fireclay	Panther Creek
Buckles and rattails.....	Fireclay	Volclay	Panther Creek
Cracked castings.....	Panther Creek	Fireclay	Volclay

Note: Where asterisks (*) are shown, the bentonites are practically equal. Moisture content is a most important factor on physical properties.

AMERICAN COLLOID COMPANY

363 WEST SUPERIOR STREET • CHICAGO, ILLINOIS

Producers of Volclay and Panther Creek Bentonite

FOUNDRYMEN: WRITE US FOR REPRINTS OF THIS SHEET, AS MANY AS YOU WANT. JUST ASK FOR "NL No. 6"

(*Continued from page* 228)

proved ineffective and either have been or should be replaced.

About the only types of shakeout operations where downdraft might be considered would be foundries where flasks have a large sand-to-metal ratio and are shaken out cold. Under such conditions sand still retains a high moisture content, and dust is not generated to a great degree or with pronounced direction of travel. Exhaust volumes of 200 cfm per square foot of grate area have provided satisfactory control for such installations. Even under these ideal conditions, the objections outlined below should be reviewed before selecting this method.

Reasons downdraft exhaust seldom provides a satisfactory system include:

1. Natural path of dust and gas travel is upward, directly opposite to direction of air travel.

2. Zone of maximum dust concentration is considerably above the shakeout grate, so much of the exhaust air short circuits from the floor area through the grate without influencing the area of dust generation.

3. The breaking of a flask may cause a temporary coverage of the entire grate, blocking the flow of air during the interval of maximum dust generation.

4. Shakeout hoppers act as surge bins to even out flow of sand to preparation equipment. Exhaust connections will be frequently blocked by sand in the shakeout hopper, building up to the under side of the shakeout grate. This condition is especially prevalent where large castings are shaken out. The sand load in one large flask removed in one or two minutes may be equivalent to the full capacity for the conveying equipment for 30 minutes or even longer. This situation explains the frequent piles of sand in front of a steel foundry shakeout that is gradually fed through the shakeout grate for hours after the shakeout shift has finished.

5. The flow of exhaust air through the falling sand means the aspiration and removal by the exhaust system of large quantities of usable sand particles even under ideal downdraft exhaust conditions.

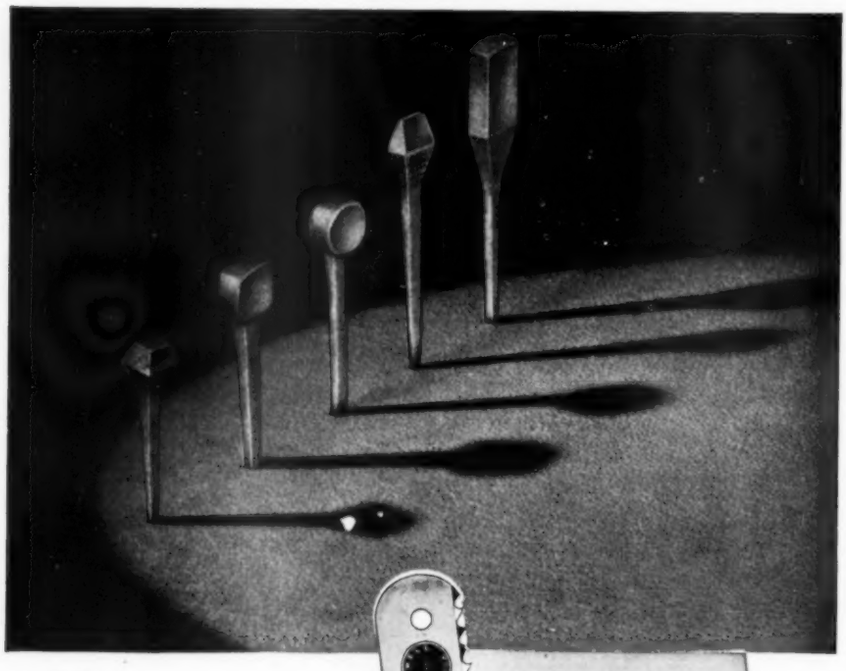
Side Hood, Fig. 10, has proved the best solution for the average shakeout that cannot be provided with an overhead hood. It is adaptable to shakeouts of all sizes, and blocks or obstructs access to only one of the four shakeout sides. As the shakeout is usually placed near the line of building columns, the one side is "blind" in most cases and provides the side for the shakeout hood without interfering with flow to or from the shakeout grate. Such side hoods have been in service by the hundreds for a number of years, and have allayed the fears of the foundryman that they would be smashed by a swinging flask within the first week of operation. They must be heavily constructed and reinforced to stand some abuse, but the skill of the average crane operator need not be questioned after witnessing his manipulation of flask and casting during the shakeout cycle. The improved vision and absence of smoke and dust in the crane cab area offers an added incentive for reasonable care.

Estimate Volume Required

To date no investigator has produced an accurate equation to permit calculation of the exhaust volume required for such side hoods. The complexity of such a formula will be apparent to the person familiar with foundry variations in shakeout sizes and proportions, flask sizes and height, casting size and temperature at time of shakeout, sand-to-metal ratio in the flask with its effect on sand temperature and moisture content, cross drafts and convection currents in the shakeout area.

As the flask is broken, there is a release of gas and dust that is projected upward at varying velocities, sometimes

(*Continued on page* 232)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Sound Castings
SMOOTH and CLEAN
CAPEWELL CHILL NAILS
They are cold rolled from the finest soft iron. The Capewell line is the most complete — with nails for every purpose and every size of casting. Samples and prices promptly sent on request.
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CAPEWELL
HACK SAW BLADES
Cut Costs and Cut Time
The Capewell method of heat treating provides you hack saw blades that cut faster and last longer. Test them yourself, on your toughest job. Order from your mill supply man.
CAPEWELL
CHILL NAILS • HACK SAW BLADES

Books You'll Want

If you want to broaden your knowledge of the foundry industry the following informative and instructive books will prove most helpful. Select the ones you need at once—use the convenient order form below.

Gates and Risers for Castings *Price* $4.00.
By Pat Dwyer. Sound foundry practice. How to prevent casting defects.

Modern Core Practices and Theories *Price,* $5.00
By Harry W. Dietert. A book devoted completely and in great detail to the production of cores. Will prove beneficial to every foundryman.

A.F.A. Symposium on Malleable Iron Melting *Price,* $3.00
Comprehensive, authoritative compilation. Just recently off the press.

Modern Blast Cleaning and Ventilation *Price,* $4.00
By C. A. Reams. Casting cleaning methods presented and discussed in detail. Also abrasive selection and use.

Tales from the Gangway *Price,* $1.00
A rollicking series of articles that contain practical solutions to everyday foundry problems. Written as only Pat Dwyer could do it.

Alloy Cast Irons *Price,* $3.25
Second edition. Thoroughly covers the subject in theory and actual foundry practices.

AN ESSENTIAL ENGINEERING REFERENCE VOLUME

THE 1944

CAST METALS HANDBOOK

Compiled specifically to enable the user of cast metals to select the material best suited for his purpose. It gives reliable working data on the properties of cast metals—unbiased and substantiated information on new developments and improvements plus practical and up-to-date facts on how to get the most out of your castings designs.

Price, $6.00

Elementary Foundry Technology *Price,* $3.00
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(Continued from page 232)

almost explosive in action. The thermal or stack effect from the heat radiation varies with the size and temperature of the casting and causes an induced air flow in the shakeout area that must also be exhausted if the shakeout operation is to be effectively controlled. With such a set of variables it is surprising that the empirical recommendations of exhaust volumes in the range of 400 to 500 cfm per square foot of shakeout grate should prove successful in a high percentage of installations with shakeout sizes ranging from 4 x 6 ft to 8 x 10 ft and larger. This is all the more noteworthy when it is realized that the definition of "successful control" refers not only to maintaining acceptable dust counts in the breathing zone, but also in satisfying the more critical standard of the foundryman who invariably insists that all smoke and steam be exhausted without visible escapement.

While different designers distribute the exhaust air volume in various proportions over the face of the shakeout hood, it is probable that the volume of air exhausted is the controlling factor with the method of distribution playing a minor role in the effectiveness of the control. Exhaust volumes in the range of 400 to 500 cfm per square foot of shakeout grate will prove effective for most installations only where:

1. Shakeout hood is installed parallel to the long side of shakeout grate.

2. Hood extends over grate to cover at least one third of the grate area. This roof can usually be extended to within 6 to 18 in. of the center line of grate, and every added inch of coverage is worth hours of careful study to obtain. This partial overhead extension is in the direction of dust travel and has the effect of reducing the distance the exhaust air flow must "reach" to deflect particles to the hood.

3. Hood must be longer than the grate side if control in the far corners is obtained. This is entirely logical as air at the ends of the grate has an opportunity of short circuiting around the corners of the hood and tends to produce little or no air movement at the shakeout corners. Extension of the hood length moves this corner of poor air flow beyond the actual corner of the shakeout grate. This air flow picture is illustrated in Fig. 6. Data was obtained by a velometer measuring the horizontal vector of air flow only; and while no brief is held for this method, the velocities recorded are useful to indicate relative magnitudes and to permit obtaining comparable data from a number of installations in a minimum of time and with a minimum of equipment.

Overcome By Side Shields

Cross drafts and, to a lesser extent, convection currents in the shakeout area can cause a disappointing reduction in the effectiveness of side hoods for shakeout control. This difficulty can be largely overcome by the use of a single side shield, Fig. 5, or, where possible, two side shields, Fig. 1. While reduction in air volume is not recommended with these modifications, their use is very desirable to assure maximum effectiveness of the air volume handled. In addition to offsetting cross drafts, the side shield will greatly improve the air flow at the far corners of the shakeout, as indicated in Fig. 7, and are almost essential for very large shakeouts such as a 16 x 18-ft grate size. Side shields could be used in many shakeout installations now in service without seriously interfering with shakeout procedure and would provide more effective control under all conditions.

The use of double side hoods has interesting implications in that the exhaust volume might be reduced to 300 to 400 cfm per square foot of grate area. Their use does hinder and blind the crane operator to an extent that they have not proved too practical for foundry work unless the space between hood extension

101

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is so great that the effectiveness of this construction is defeated. Where double side hoods are employed there is some indication that the total exhaust volume handled through one of the two hoods will prove more effective than exhausting 50 per cent of the volume through each hood.

Complete Enclosures have been attempted on numerous occasions in an effort to reduce the exhaust volume requirements and to obtain positive assurance of effective control for larger shakeouts. Where identical flask sizes and few different casting sizes are handled, such enclosures with automatically-closed access doors and vibrating cycle have been successful and ingenious designs have been developed to meet the special requirements of each job.

In most other instances where doors and swinging roof for the shakeout enclosure must be actuated by manual control, results have been disappointing as it seems impossible to rely on the human element where operations increase the time required for the shakeout cycle. Such enclosures are further hampered by the need in most cases of keeping the chain slings attached to flask or casting for manipulation. Length of slings, height of flask, and amount of vertical movement employed all dictate the minimum opening in the enclosure roof.

Exhausted By Side Hoods

Core knockout operations conducted on vibrating shakeout grates are usually exhausted by side hoods of the same construction described previously for shakeout operations. Fine burned sand particles are jarred from the hot casting as the cores are loosened, and exhaust volumes of the same magnitude recommended for shakeout hoods apply.

Where cores cannot be removed mechanically, the hydraulic method has eliminated the extreme dust hazard previously encountered in manual removal with pneumatic tools. This operation illustrates a change in process brought about largely because of the dust control problem which, incidentally, has greatly increased the speed of core removal.

Many foundries still remove intricate cores manually, and dust control becomes a considerable problem due to the size of the working area, the close proximity of worker to zone of dust generation, and the need for access to all sides of the casting. In such instances, castings vary in size and shape, making booths, partitions, downdraft grilles and similar aids to ventilation control difficult to adopt. Considerable success, however, has been obtained by doing such manual core knockout operations on a floor grille through which the removed cores and core sand will drop to storage hoppers.

Suction boxes exhausting 200 cfm per square foot of floor grille area have given satisfactory dust counts, especially where operations are confined to a width of grille not exceeding 6 to 8 ft; where suction box is on long side of grille; and where grille is located against a wall or partition to assure maximum efficiency of air flow over dust producing zone. Partitions or walls at the ends of the grille, and extending into the casting storage area, are helpful. Exhaust through suction box should be located close to the floor to direct as much dust as possible away from the breathing zone.

(To be concluded next issue)

Incentive Pay Plan Described

To acquaint management and employees with a new type of plant-wide incentive pay plan which automatically raises employee earnings in proportion to production increases, the Eddy-Rucker-Nickels Co., management counsel, Cambridge 38, Mass., has published a comprehensive outline of the Rucker "Share of Production" pay plan. Copies are available from the company without charge.

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FOUNDRY USES CUPOLA AND DIRECT METAL

(*Continued from page* 107)

vertical walls of the mold, prevented any loose sand or other foreign material from falling in while the molder was effecting minor repairs to defective print edges, or in filling the hook holes and drying the sand patches with a torch.

With all the cores in place as shown in Fig. 3, a dough worm was placed all around the joint of the mold, and on top of each core print. The cope was lowered into place, and lifted away again temporarily so that the molder might satisfy himself that the surface of the cope had touched on all the areas it was supposed to touch upon. The cope then was replaced and weighted down, and large runner basins were built up over the various sprues.

The 40-ton solid steel cylinders used in various combinations for weights on large molds in the foundry are more or less of an heirloom. Awkward to handle, too large to break or to melt, they laid around for many years until an inventive foundryman had a bracket welded on a carefully determined weight center point. A clevis and pin, easily attached and detached, furnishes a ready means of suspending the weight from the crane.

All cupola metal is used to pour bed casting due to sections of metal. Direct metal from the blast furnace and cupola-melted metal in the foundry are supplied in any desired quantity and composition for pouring large castings. In the present instance the analysis of the engine bed casting showed total carbon 3.28 per cent; Si 1.86 per cent; Mn 0.52 per cent; S 0.095 per cent; P 0.320 per cent; transverse strength 2380 lb with 1.20-in. bar, 18-in. centers, and tensile strength 36,000 psi.

Engage in Outside Work

While a considerable part of the floor is devoted to the production of outside work, including exceptionally large gray iron castings, the main function of the foundry is to supply castings for plant maintenance, blast furnaces, open hearths, coke ovens, forges and rolling mills, transportation by land and sea, rolling stock, mines and quarries and many other activities. Orders for some of these castings are intermittent, while others are produced steadily on a standing order. Usually in the latter case special equipment and technique have been developed to simplify and facilitate rapid production of the castings. A typical instance in this class is the cinder or slag pot employed in open hearth operation for removing slag from the furnace to the dump. The castings have a limited life because of the constant expansion and contraction. Eventually they crack and their useful life is ended. They are broken into pieces and remelted.

The outside of the mold is made in a pit in the floor. A plain pot, also known as a thimble, or lining, might be made in a permanent loam mold, requiring a minimum amount of patching after the removal of each casting. The casting under discussion is surrounded for practically half the vertical face by horizontal and vertical brackets and two large trunnions by which it is suspended in the railroad chassis. Removal of the casting wrecks the dry sand mold. The wrecking is complete by the long tile sprue which extends almost to the bottom of the mold and is connected to the casting by three narrow step gates. This type of gate is used in preference to the ring of pop gates usually employed on this type of casting, because mold and core are dry sand. A wood cross on top of the pattern leaves a mark on the joint for guiding the cope into place.

(*Concluded on page* 236)

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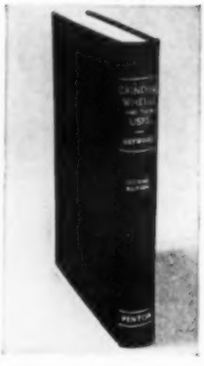

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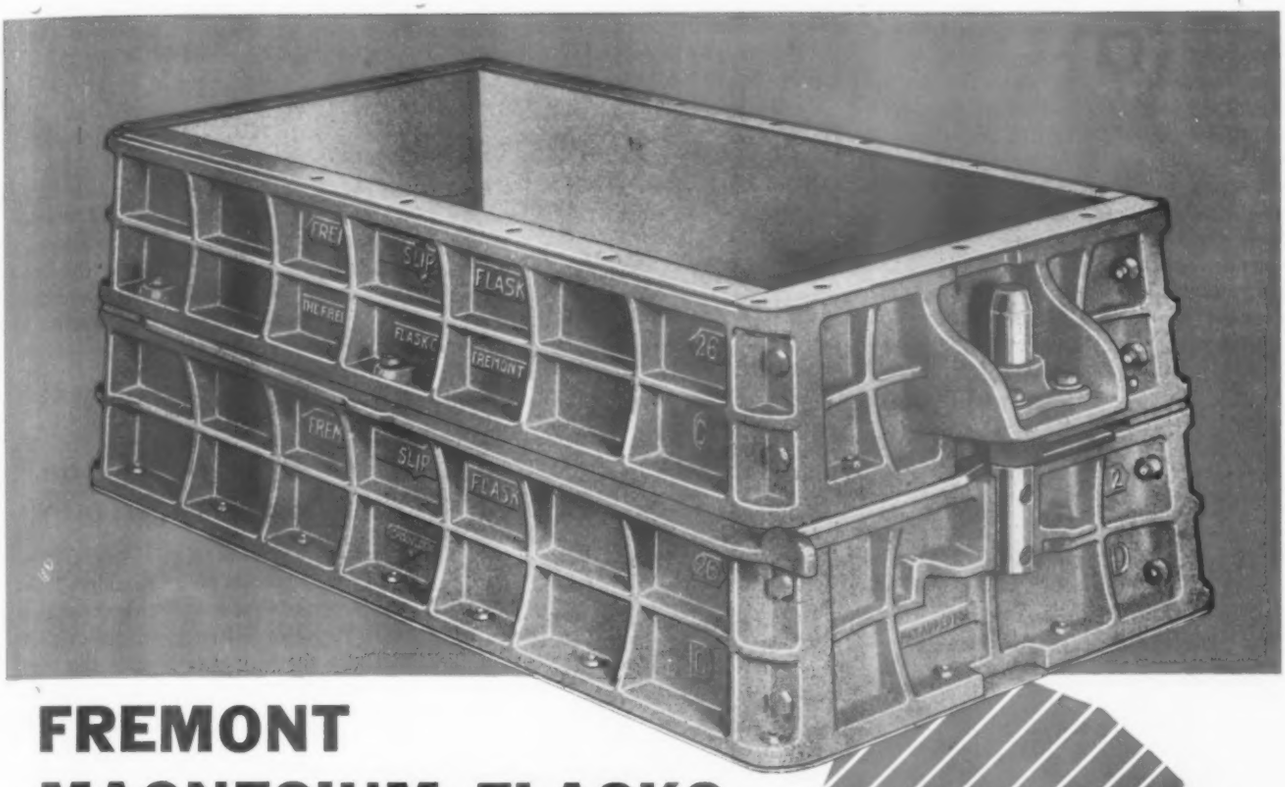

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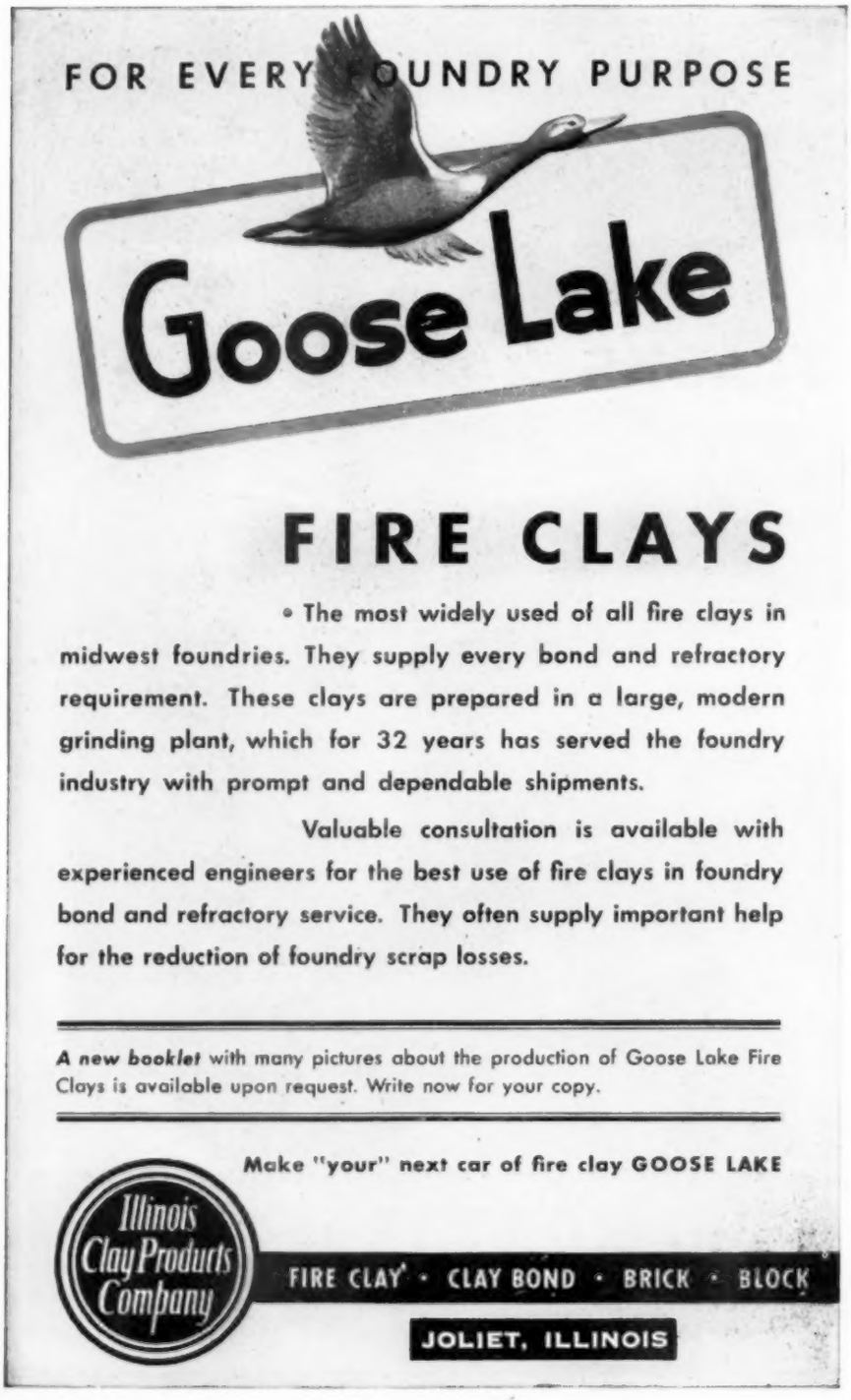
(*Concluded from page 234*)

Combined cope and core is made in a permanent concrete corebox sunk in the floor some distance away from the drag part of the mold. On account of the natural contraction of the casting, no method has been discovered up to the present for saving the core and using it over again. A complete new core must be made for each casting. However, the concrete corebox facilitates making the core, and removes the hazard incident to inverting the core as made by another method where the core is built up on a foundation plate and then rolled over before it is lowered into the mold. In the present method the core is lifted straight up out of the corebox and lowered straight down into the mold.

A cast iron arbor or crab, with the ends of the bars conforming to the curve of the casting and with a clearance of an inch all around, is lowered into the corebox. Sand is rammed to the top of the arbor and then four stout hook bolts are attached to loops in the arbor. The bolts are long enough to extend 6 in. above the cover plate. The remainder of the space in the corebox is rammed full of sand reinforced at every course with rods laid horizontally. At the floor level the sand is scraped off level and the cover plate is set in place. Lugs on the rim are guided into place by guide blocks on top of the corebox. Short pieces of rails are laid across the central opening in the plate, and with nuts and washers the bolts attached to the arbor are drawn up tight. Turnbuckles suspended from a four-way cross hanging from the crane are attached to the steel loops provided for the purpose in the cover plate. As a minor feature it may be noted that the notches in the cross are numbered for quick and accurate adjustment.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Issues Booklet on Foundry Costs

In a 20-page booklet, "Foundry Costing for Engineers and Founders," recently issued by the Welsh Engineers and Founders Association, the author and also the vice president of the association, Arthur J. Burn, states that the notes were written with the idea that they might serve as a basis for discussion of some of the difficulties lying in the way of accurate costing in general foundry and engineering work.

Owing to the variety of product, he claims it is difficult to work out any system that is both simple and accurate. Dead accuracy cannot be realized, particularly on indirect charges. Apportionment of these largely is a matter of judgment. Knowledge of manufacturing processes is as necessary as knowledge of accountancy. A preliminary stage is to arrive at the total cost of each department of a works and ascertain an average hourly cost rate per skilled man. A first requisite is that every item of expenditure chargeable against costs is taken into account. Sample cost sheets Nos. 1, 2, 3 and 4 are presented for illustration. The accompanying text takes each cost sheet and amplifies and clarifies details of the various items.

The booklet, available through the office of the secretary, J. D. D. Davis, Welsh Engineers and Founders Association, 1, St. James Gardens, Swansea, South Wales, is a clear exposition of an admittedly difficult subject.

Publishes Yearbook

American Society for Testing Materials, 260 South Broad St., Philadelphia 2, recently published its *Yearbook* for 1945. Containing over 464 pages the book gives information on the officers and members of the executive committee, administrative and editorial staff, and the various committees of the society.

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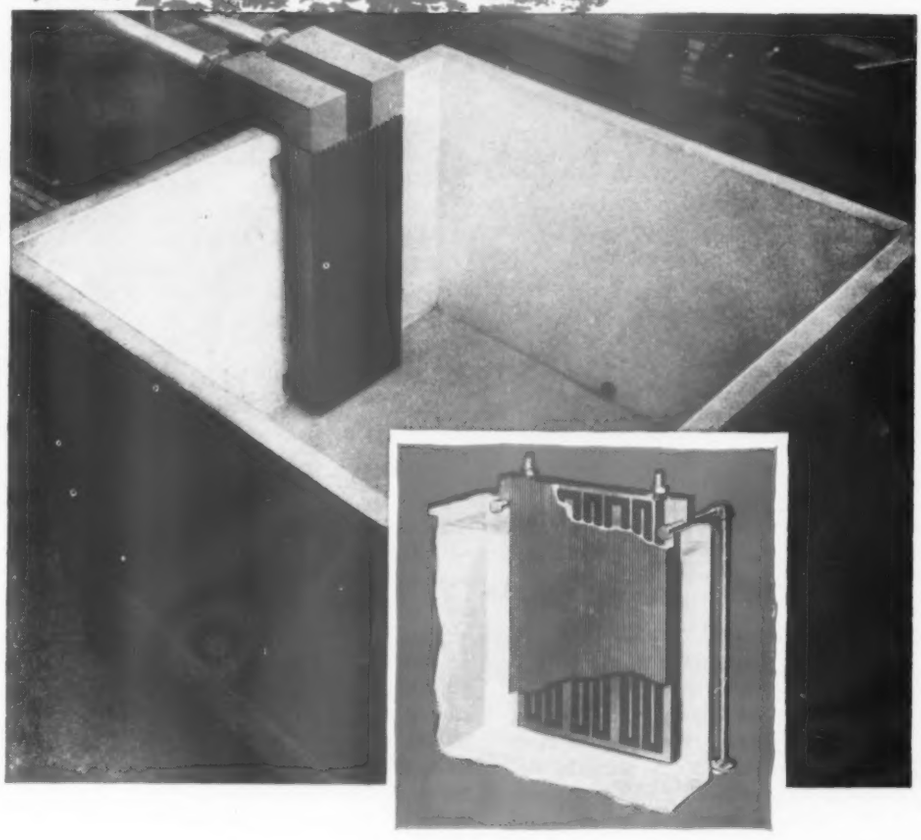

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NONFERROUS COST ACCOUNTING

(*Continued from page* 238)

even in the broadest assumption, for cash and inventories (raw materials and supplies) to remain the same at the end of any period of operation and also that materials (raw materials and supplies) used and all payrolls (salary and wages) necessary to produce the $3000.00 of billings would exactly equal the $2455.00 of collected income from those sources. If this were possible however, the preceding Balance Sheet which is not in balance due to the last entry not being a perfect equation, would be brought in balance by showing as a Liability under *Surplus and/or Profit* for the period $555.00 and portrayed in the following fashion:

Assets

Cash	$ 600.00
Inventories	400.00
Land and Buildings	1500.00
Machinery and Equipment	500.00
Notes and Accounts Receivable	555.00
Total Assets	$3555.00

Liabilities

Capital	$1000.00
Notes and Accounts Payable	2000.00
Surplus and/or Profit	555.00
Total Liabilities	$3555.00

But as "X" Company is now an operating company, it is very probable that there are several days payroll that is owed the employees. Some of this payroll might be on castings that already have been shipped and billed, the balance on castings in a semifinished state—not cleaned or ground, and therefore represented as part of the inventory. Therefore, to say that all of the $555.00 due the company on accounts receivable was a profit is erroneous.

Set Up Reserve Accounts

To take care of this sort of company liability through accounting channels, it is customary to set up reserve accounts. For a small operation, the number of this type of account need not to exceed the two shown in the exhibit. (Exhibit *E*)

For the accrued payroll let us take, for example, that "X" Company makes a practice of paying its employees on Thursday of each week for the preceding week, and that in this case the Balance Sheet has been prepared for a month that also ended on Thursday. On this basis then, the inventories or billings will include four days of payroll that has not been paid. If the payroll for the company was $270 weekly or $45 per day, there would then be an accrued payroll liability of $180 which would have to be shown as a reserve, and to be taken from the *surplus and/or profit* account. Our Balance Sheet would then look like this:

Assets

Cash	$ 600.00
Inventories	400.00
Land and Buildings	1500.00
Machinery and Equipment	500.00
Notes and Accounts Receivable	555.00
Total Assets	$3555.00

Liabilities

Capital	$1000.00
Notes and Accounts Payable	2000.00
Reserves	180.00
Surplus and/or Profit	375.00
Total Liabilities	$355.00

There are still several other items that require handling in a similar fashion. These for "X" Company would be a reserve set up to (1) pay the interest on the land and building notes and to retire the note (2) the interest and deferred payment on the machinery and equipment (3) local property and personal tax (4) any fund that might provide for employee vacations, etc. (5) or other miscellaneous contingencies.

Reserves for Current Needs

For the purpose of completing the Balance Sheet started for "X" Company, let us use the following amounts as reserves for the foregoing needs. On the land and buildings the monthly interest is $5.00 for the first year with $8.33 set aside to retire the note. On the machinery and equipment the monthly interest is $2.00 and the payment amount $50.00. The local property and personal tax is $10.00 monthly. The management has an agreement with the employees that each one that completes a year of service is entitled to a week's paid vacation. To meet this, a reserve of $22.50 per mo. must be provided. In addition to this it was decided to provide a fund to cover payments of insurance on the buildings as well as on the manager's life and to provide a small fund in case there were unaccountable losses in inventory. To meet these later contingencies a provision of $25.00 monthly is made.

The total of this type of reserve would then be $122.83 monthly; this would be divided showing $112.83 as other reserves and $10.00 as a tax reserve. Each item in the reserve account is to be listed separately on the General Ledger Sheet for *Reserve Liability Other* as shown on Exhibit *E*. With these amounts deductible from the *Surplus and/or Profit* account our Balance Sheet to conform will then appear as shown on Exhibit *A*.

We have still neglected the largest single item of reserve, that of tax on income. The reason for that is obvious, as "X" Company can be any one of several different kinds of an organization, and we believe we would be missing our purpose to have as a part of an accounting and cost manual any explanation or examples that would deal with so complex a problem, and which could not be treated comprehensively enough to be of any value to the industry.

"X" Company can be (1) *an individual* in which case the entire profit or surplus account for any period would be represented as that individual's income for that period; this would then be recorded as a liability on accrued payroll and the tax handled on an individual tax return (2) *a partnership*, of two persons on an equal basis both active in the operation of the business and receiving equal distribution of profits as salary (3) a partnership, of two persons, one active and the other inactive, in which the active partner receives a certain percentage of the profit as salary before the equal distribution of the balance (4) a partnership of three or more persons with varying degrees of active participation in company affairs and therefore equal or unequal distribution of profits as salary. In 2, 3, and 4 all profit or surplus might be disposed of as salary income and taxes handled through the media of individual returns. (5) as a stock company, in which case a definite salary would be assigned to the managers and/or officers.

Establish Definite Salaries

In all these cases (1, 2, 3, 4, and 5) a definite salary income for individuals could be set; in that instance, the surplus and profit figure would very probably be much lower than that shown.

If "X" Company is a stock company, provision in the reserve account will have to be made to take care of the tax on income. Dividends that have been declared by the directors out of profits after taxes would also show as a liability.

It must be remembered that up to this time in our manual we have not attempted to give a fully developed accounting procedure, but rather a simplified outline that will meet the requirements of the small operator. This outline covers all the basic fundamentals from which, at some later date as we carry on in this phase of activity, we intend to show what might be considered as progressive steps to be taken by a company as to the number and kinds of accounts and records that are essential as that company shows continual growth. Likewise, the most comprehensive accounting structure in use today in the industry could be condensed to this simple form.

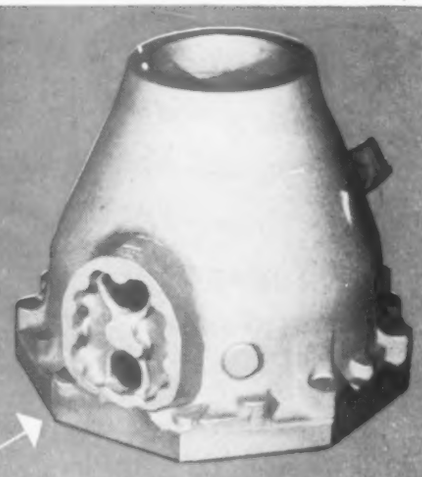
The actual clerical effort necessary to maintain these records for the average small operator should not exceed one hour weekly. If they are not kept, certainly the mental agony of not knowing

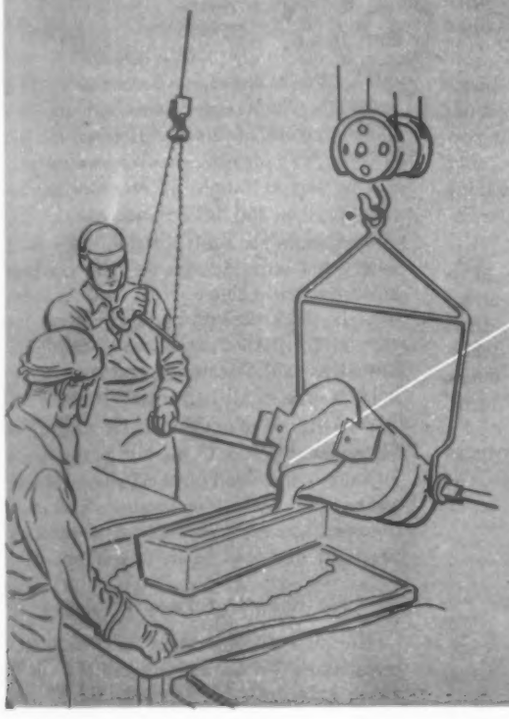
(*Continued on page* 240)

in modern foundries everywhere

they're casting lightness

and strength





For lightness . . . and soundness and strength . . . they're casting magnesium today. It's a standard material for many modern castings, ranging from tiny fittings a few ounces in weight right up to big pump bases weighing hundreds of pounds.

Progressive foundrymen have come to recognize the good casting characteristics of magnesium alloys. Manufacturers know magnesium castings improve products because they weigh less. And there is no structural metal to equal the strength-weight ratio of magnesium.

Dow offers a full line of casting alloys and accessory materials, as well as the services of its own fully equipped foundry. Behind these products and services stands the experience gained during more than 29 years of producing, alloying, and fabricating magnesium. The nearest Dow office can give you full details on magnesium application.

Ready . . . to make products move!

MAGNESIUM

LIGHTEST OF ALL STRUCTURAL METALS

Dow produces casting alloys to meet a variety of property requirements; also a complete line of fluxes and accessory materials.

Continuous magnesium research and development work enable Dow to offer foundries full engineering assistance on all related technical problems.

Procedures and facilities for working magnesium, such as sand casting clean-up, are readily available in many modern plants.

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle

● The above statement is typical of many reports received from safety directors and plant managers about CESCO'S improved face shield with the new plastic headgear.

FOUR GOOD REASONS
why this CESCO Shield gives better service:

1. **Durable**—the newly designed headgear is made of flexible, long-wearing plastic, which has proved more durable than other headgear materials.
2. **Clear, tough windows**—made of sturdy plastacele. An exclusive, simple method of attachment permits quick window replacement.
3. **Comfortable**—the flexibility of the plastic headgear and the simple adjustment to varying head sizes assure an easy, comfortable fit on every wearer.
4. **Clean and sanitary**—the plastic headgear does not absorb dirt or moisture, and is easily cleaned with a cloth.

4 styles available —Write today for literature and prices

CHICAGO EYE SHIELD CO.
2336 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY

(*Continutd from page* 238)

your exact financial standing would more than offset the small expenditure of time and it would be far from coming under the category of unnecessary "red tape."

The Non-Ferrous Founders' Society, thinking that many members of the industry would be interested in securing the forms necessary to make a simple installation of this kind, has made available through its general office in loose leaf binder form a complete set at a price lower than it usually can be obtained from other sources.

As a further service to the industry and to get greater uniformity in methods of record keeping, we have made it possible by application to the society office for assistance at nominal cost in making initial installations and to provide training in upkeep.

The next section of this manual is "The Balance Sheet Chart of Accounts," as related to Exhibit *A*. The last section of the manual gives the complete definitions of the accounts for both the balance sheet and the profit and loss statement.

BALANCE SHEET CHART OF ACCOUNTS

Assets

10. CASH
    (a) Petty cash
    (b) In banks
    (c) Cash restricted
    (d) Time deposits
    (e) Marketable securities
    (f) Other investments
    (g) Sinking fund
11. INVENTORIES
    (a) Raw materials
    (b) Work in process
    (c) Finished stock
    (d) Supplies
12. NOTES AND ACCOUNTS RECEIVABLE
    (a) Customer accounts receivable
    (b) Customer notes and acceptances receivable
    (c) Due from officers and employees
    (d) Accrued interest and dividends receivable
    (e) Sundry debtors
13. LAND AND BUILDINGS
    (a) Land
    (b) Buildings
    (c) Structures
    (d) Piping and wiring
    (e) Sprinkler systems
    (f) Heating-ventilating and air conditioning
14. MACHINERY AND EQUIPMENT
    (a) Machinery
    (b) Electrical apparatus
    (c) Ovens and furnaces
    (d) Shop fixtures and equipment
    (e) Tools and instruments
    (f) Transportation system
    (g) Automotive equipment
    (h) Furniture and office equipment
    (i) Fire protection apparatus
    (j) Patterns, drawings, patents, development and good will
    (k) Other miscellaneous assets

Liabilities

20. CAPITAL STOCK
    (a) Amount of invested capital
    (b) Par or stated value of shares outstanding
    (c) Treasury stock
21. NOTES AND ACCOUNTS PAYABLE
    (a) Trade accounts payable
    (b) Notes payable to banks
    (c) Trade notes and acceptances payable
    (d) Mortgages payable
    (e) Bonds payable
    (f) Other long term debt
22. RESERVES TAXES
    (a) Accrued taxes
    (b) Reserve for federal income and excess profit taxes
23. RESERVES—OTHER
    (a) Accrued payroll
    (b) Accrued interest payable
    (c) Long term debt due within one year
    (d) Reserve for vacations
    (e) Reserve for possible future inventory losses
    (f) Reserve for insurance
    (g) Other accrued liabilities
    (h) Advanced payments received on sales contracts
    (i) Advances from stockholders, etc.
    (j) Dividends payable
    (k) All other contingencies
24. SURPLUS

The Profit and Loss Statement: The accounts which enter into and support the Statement of Profit and Loss are relatively few for the small operator and can be just as simple in structure as the outline given for the Balance Sheet.

The sugested form (Exhibit *F*) will meet the requirements of the various governmental agencies, as well as adequately show the results of operation for any given period and give useful information to the owner, operator or stockholders of a small business.

We will develop the Profit and Loss Statement for "X" Company in the same manner as that used on the Balance Sheet, taking the basic elements of operation followed by example of use of accounting practices that lead to its development.

Keep Record of Pounds Shipped

The first consideration in this statement as shown on the suggested form is *Gross Sales Billed*. Normally this would be a simple task of a chronological listing in dollar value of the shipments as they are made. Usually, however, a record of pounds shipped would be kept along with this. In discussing this with OPA, they have requested that a distribution of sales shipments by kinds of metal in dollars and pounds be kept. It does not necessarily follow that because they have requested this kind of record that it must be done, but we feel that if any relief is sought in the pricing structure they will want such an analysis.

To make this analysis, we have selected another standard loose leaf form (Exhibit *G*) collecting this data prior to posting to the General Ledger sheet.

In the legend of the Balance Sheet section we assumed and used a sales figure of $3,000.00. It was not stated if this total was the gross or net amount of sales. Let us assume further in our development and to portray as close as possible actual operating conditions, that this is net, and that the gross sales were $3,120.00. From the sales distribution sheet (Exhibit *G*) we find that this was divided to the major classifications of 7000 pounds to brass with a value of $2,007.00 and 2350 pounds to aluminum with a value of $1,113.00.

As it happens in most businesses and particularly in a foundry, a casting that appears good on shipment might prove defective after the scale is removed in machining; off in chemical or physical analysis, or otherwise unsatisfactory due to core shift, incorrect core or a multitude of other reasons. This causes returns and will represent deductions from the *Gross Sales Billed*.

The usual procedure to take care of these adjustments is by the issuance of *Credit Memorandum;* a recap or listing of these is all that will be necessary for "X" Company, prior to posting to the *Returns and Allowance* account in the general ledger. This listing can be done on the same kind of form as used for the sales distribution, showing totals only, or it can be made more detailed if desired. If an analysis of credit memorandums is made, we would suggest following the same pattern as that used in the exhibit on sales distribution by showing the pounds and value of returns by kind of metal, with a separate column to show other allowances given. For example, "B" Company returns 100 lb of its 500-lb shipment. This particular type and kind of casting was sold to them at 30 cents per pound. The credit to be issued to them in this case would read as follows:

Oct. 15 return of 100 pounds casting your pattern 2475 @ 30c per pound $30.00

This would then be posted on a *Returns and Allowance* distribution sheet.

Our posting to the general ledger sheet of *Returns and Allowances* for "X" Company's activities at the end of the first month of operation would be $120.00. The *Net Sales Billed*, therefore, would be $3,000.00.

The next item on the Profit and Loss Statement is the *Cost of Sales*. At this point and for posting to the general ledger this account is a summary account. The elements of cost that provide a basis for costing sales will be treated in a succeeding section of this manual. For the purpose of the illustration, however, we will use the $2445.00 previously mentioned as the cost of sales. As this covers only labor, raw materials and currently needed supplies, it is not the total cost. To cover operating expense the other items on which we have set up reserves that have a direct bearing on operation will have to be included and, therefore, our cost of sales, since the inventory has remained unchanged, will be $2,625.00.

Operating profit is the difference between *Net Sales Billed* and *Cost of Sales*. In this case it would be $375.00.

Other Income in the case of a small business would probably be discounts on purchases and other deductions from income, the total of which is covered in

ARE YOU ADDING

NO. 90 IRON OXIDE

to your regular core sand mix?

- No. 90 gives CLEANER CASTINGS.
- Prevents core burning, veining.
- Reduces casting cleaning costs.
- Assures Improved Cores.
- Inexpensive, economical, better.

Order Today!

TAMASTONE
Pattern Compound

Speeds production 400%, cuts costs 75%. Gives micrometer accuracy. Converts loose and metal gated patterns into match plate production or larger separate cope and drag patterns. It's the easiest way to increase production and reduce cost!

TAMMS SILICA CO. 228 N. LaSalle St., Chicago 1, Ill.

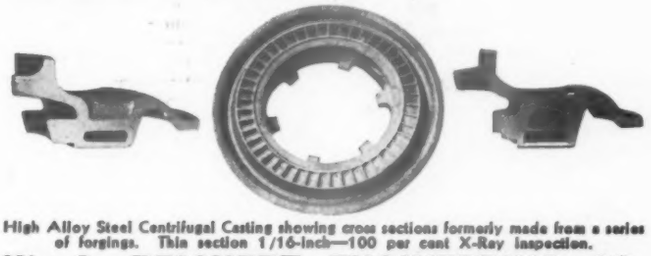
QUALITY • DEPENDABILITY
UNIFORMITY • PRODUCTION
...Vital in the Casting of Metals

FOUNDRY SPECIALISTS

A highly skilled staff of Foundrymen . . Engineers . . Metallurgists

SPECIALISTS IN:

- Methods for Improving Production and Decreasing Costs
- Metallurgical Control and Standardization
- Mechanization and Modernization
- Scientific Foundry Management
- Manufacture of Centrifugal Castings



High Alloy Steel Centrifugal Casting showing cross sections formerly made from a series of forgings. This section 1/16-inch—100 per cent X-Ray inspection.

W. G. REICHERT ENGINEERING CO.
1060 Broad Street —*Foundry Specialists*— Newark 2, N. J.

HOW TO GET
RIFLE-FIRE
AIRBLASTING

American Airblast Nozzles give you the economy of "rifle-fire" blast cleaning through many long hours of service. The best of materials and careful engineering design make them highly resistant to wear, keeping the blast stream concentrated the same as a rifle does the force behind a bullet.

The bore of a cheap nozzle wears quickly . . . runs compressed air costs way up . . . dissipates the blast stream and lessens cleaning effectiveness. Such a nozzle can be unbelievably expensive. You'll be surprised when you figure it out in your own operations. Nozzle wear wastes air . . . and your money fast!

American Airblast Nozzles will give you long, economical and efficient service. They are made in three grades: American-Norbide, American-Heanium, and American V-Metal. Their range will cover your complete requirements for service, size, and price.

Write for full information today!

NEW NOZZLE CATALOG

Write for your copy of the new free catalog on American Airblast Nozzles. Contains complete and comprehensive information, specifications and prices.

American
FOUNDRY EQUIPMENT CO.
505 S. BYRKIT ST. MISHAWAKA, IND.

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NOZZLES

other reserve accounts. Let us assume for the purpose of completing the Profit and Loss Statement that *Other Income* was $30.00 through purchase discounts and that the total of other deductions from income was $152.83, made up of $122.83 to cover the reserves set aside and $30.00 from a miscellaneous account, to make the *Net Income* $252.17. This, in th case of "X" Company, would also be the *Earned Surplus and/or Profit.*

The Profit and Loss Statement for "X" Company for this operating period would then appear as shown on Exhibit *F.*

As in the Balance Sheet the clerical effort attendant to records and accounts of the Profit and Loss Statement for the average small operator would not be more than one hour weekly. This again is far from the common conception of lengthy unnecessary "paper work" for such valuable and essential information.

A chart of accounts with definitions for the Profit and Loss Statement follows.

CHART OF ACCOUNTS AND DEFINITIONS FOR PROFIT AND LOSS STATEMENT

40. GROSS SALES BILLED. Summary of gross sales billed at gross price before deducting returns, allowances and discounts. Distributed to as many kinds of metal or other sub-divisions as necessary for good control.
41. RETURNS AND ALLOWANCES
    (a) Returned goods
    Credits to customers for castings sent back for any reason.
    (b) Allowances
    Adjustment in price for any reason after original billing.
    (c) Freight on shipments
    Transportation on shipments to customers where volume purchases of certain kinds make this concession.
50. COST OF SALES BILLED
    (a) Manufacturing cost of sales billed
    Summary of cost of sales billed customers, including all factory costs reflected in the finished product—if any development is involved a proportion or total of that cost as the case requires—cost of boxing and preparing for shipment, and other manufacturing and commercial costs.
    (b) *Cost of development
    (c) *Cost of boxing and preparing for shipment
    (d) *Other manufacturing costs
    *Note: Accounting of this nature may be used to accumulate any specific cost element for any reason prior to transfer to main Account No. 50.
    (e) Selling and administrative costs
60. OTHER INCOME
    (a) Purchase discounts
    Discount earned through payment of creditors' invoices within discount period.
    (b) Income from investments
    Interest and dividends on investments in marketable securities, or other investments.
    (c) Other interest income
    Interest income earned on notes, acceptances and time deposits.
    (d) Miscellaneous other income
    Other income, such as profit from sale of investments, royalties received, commission income, rental income from company property and all other sources.
    Note: If the income from any source is significant, a separate account should be provided to cover these sources.
70. OTHER DEDUCTIONS FROM INCOME
    (a) Interest on long term debt
    Interest on non-current liabilities, plus amortization of bond discount, or less amortization of bond payment.
    (b) Other interest expense
    Interest on current liabilities.
    (c) Sales discount
    Discounts allowed customers for payment of accounts within discount period.
    (d) Extraordinary charges
    All losses and unusual expenses which are not properly applicable to future periods or chargeable to other expense classifications.
    (e) Miscellaneous deductions from income
    Other ordinary expenses of a non-operating nature for which an account has not been provided.
80. INCOME CHARGES
    (a) Provision for federal income tax and excess profits tax
    (b) Estimated accrual of federal income and excess profit tax.

(To be concluded next issue)

Acid Open Hearth Group Meets

Bimonthly meeting of the Acid Open Hearth Research Association Inc. was held Nov. 8, at the University of Pittsburgh. During the business session, F. C. T. Daniels, secretary, announced the results of a survey of production statistics for the entire acid open-hearth industry during 1944. The compilation indicated that the value quoted by the American Iron and Steel Institute (1,196,000 net tons) was actually only 60 per cent of the total acid open-hearth production. The actual 1944 figures were as follows (one small nonmember plant not reporting):

	Net tons	Per cent
Ingots	946,034	49.07
Castings	981,696	50.93
Total	1,927,730	

A further breakdown indicated that this total represented 2.17 per cent of the total U. S. steel production during 1944, and that 69 per cent of all acid open-hearth steel was produced by members of the association.

Completion and distribution of the first research bulletin, "Acid Open Hearth Slag Fluidity and Its Significance," was also announced. This bulletin is available to nonmembers at $1 per copy from the secretary, P. O. Box 1837, Pittsburgh.

At the technical session, Dr. G. R. Fitterer, director of research, outlined the research program for the coming period. B. B. Rosenbaum discussed a correlation between microstructures, inclusion content, and notched bar impact values at various temperatures for 34 casting grade heats made in association plants under research staff supervision.

J. B. Kopec described Jominy hardenability test values and corresponding calculated values for the same series of heats. A complete series of physical and chemical tests is being conducted on these heats in an effort to correlate furnace

practice with physical properties, composition and structure.

J. W. Linhart concluded the meeting with the description of a rapid control method for predicting manganese recovery in acid practice. The method has been applied in one plant of the association with a large measure of success in meeting chemical specifications more closely and increasing the manganese yield.

Standard Steel Is 150 Years Old

The story of Standard Steel Works, division of the Baldwin Locomotive Works, Burnham, Pa., is presented in a new brochure "150 Years of Steel Making," which marks the sesquicentennial anniversary of a plant that never has ceased operation since it was established as Freedom Forge midway in Washington's second term as president.

The land on which the Works now stand is part of that originally warranted by Everhart Martin on April 2, 1755. After his death a tract of 225 acres was sold by his son Christopher to George Hanawalt on July 4, 1795 for £1000. On May 21, 1804 this tract was transferred to William Brown and William Maclay who had established Freedom Forge on adjacent land in 1795.

Records show changes of ownership every two or three years until 1856 when Freedom Forge was one of the largest in the state with eight fires and five hammers and an output of 930 tons of blooms and 380 tons of bars per year. In 1867 the company installed two bessemer converters and a rail mill. With the exception of the experimental plant at Wyandotte, this was the third bessemer plant in the United States. A tire mill and a double acting 10-ton steam hammer were imported from England. The tire mill is still in operation.

In 1870 William Butcher leased a part of the old Freedom Works and installed a crucible plant with 28 four-pot melting holes which produced 1519 tons of steel in 1873. He brought with him a group of 40 tire rollers, hammer men and machinists. Descendants of some of these men are in the employ of the Standard Steel Works today. The first open-hearth furnace was installed in 1895. It was served by an electrically-driven charging machine.

At present the steel producing equipment includes five open-hearth furnaces with a combined yearly capacity of 160,000 tons. Individual departments include open hearth, tire mill, wheel rolling shop, steel foundry, forge shop, spring shop, heat treating department and machine shop.

The reliable foundry pyrometer

Alnor

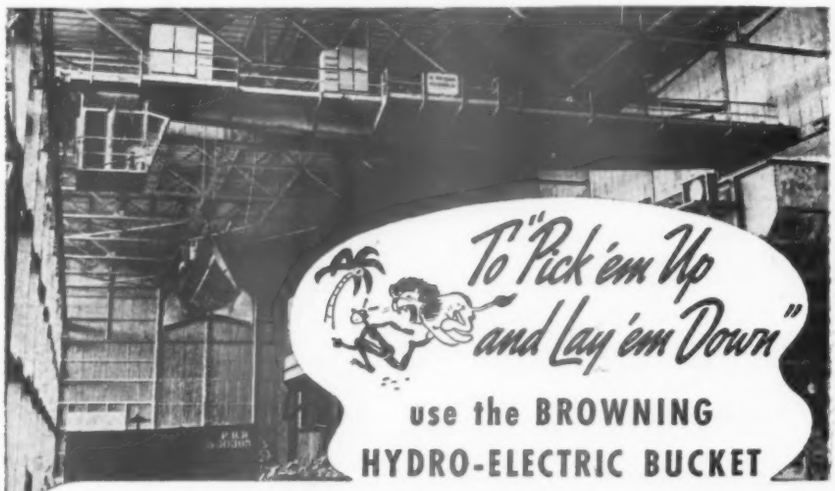
PYRO-LANCE

The Alnor portable Pyro-Lance is a rugged, durable, portable pyrometer built with shock-resisting movement and enclosed extension thermocouple. It stands up in foundry service and gives the accurate temperature readings essential to low-cost production of sound castings. Especially suited for use on molten brass, bronze, copper, aluminum bronze, magnesium alloys, and similar metals where temperatures are not over 2300 F. Long life, enclosed thermocouple takes true readings below the surface, unaffected by dross or surface conditions.

Built in standard range, 0-2500 F. Also with bare wire thermocouple for low temperature metals in crucibles or ladles. Write for bulletins giving complete description.

ILLINOIS TESTING LABORATORIES INC.

418 NORTH LA SALLE STREET, CHICAGO 10, ILLINOIS



. . NEW PATENTED PRINCIPLE, BUT TRIED AND PROVEN!

Handles many important jobs faster, better, for less. A.C. or D.C. current. Electrically driven hydraulic pump connected to cylinder and ram, in turn connected to bucket lips by trunnion; movement of ram opens and closes bucket. When bucket closes, pressure reaches maximum and oil passes through relief valve; no overloading of motor, no damage to bucket. No sheaves, cables, chains or other trouble-causing "gadgets"; closing mechanism runs in oil. Bucket opens by gravity; no power waste in closing. No headroom lost for closing. Simply hook on and plug in; 10 minutes to hook or unhook. Write today for a copy of our new, well illustrated BULLETIN.

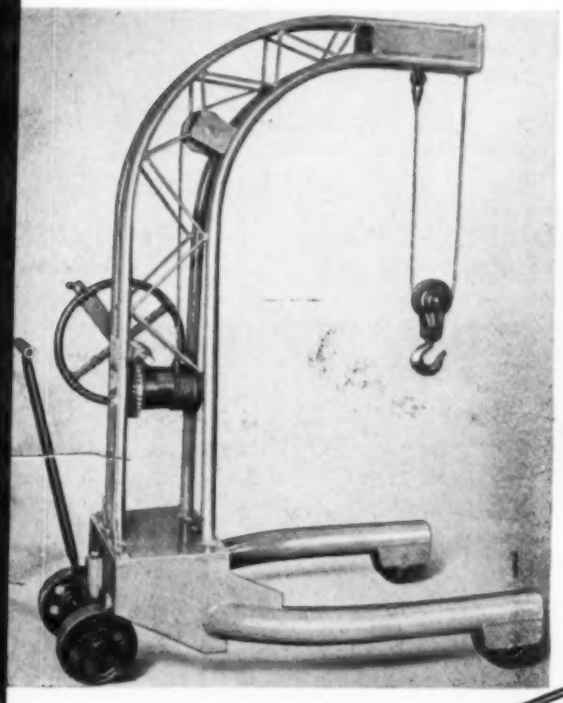
VICTOR R. BROWNING & COMPANY, Inc.

WILLOUGHBY (CLEVELAND), OHIO

Designers and Builders of All Types and Capacities of Electric Overhead Traveling Cranes and Hoists and Electric Revolving Cranes

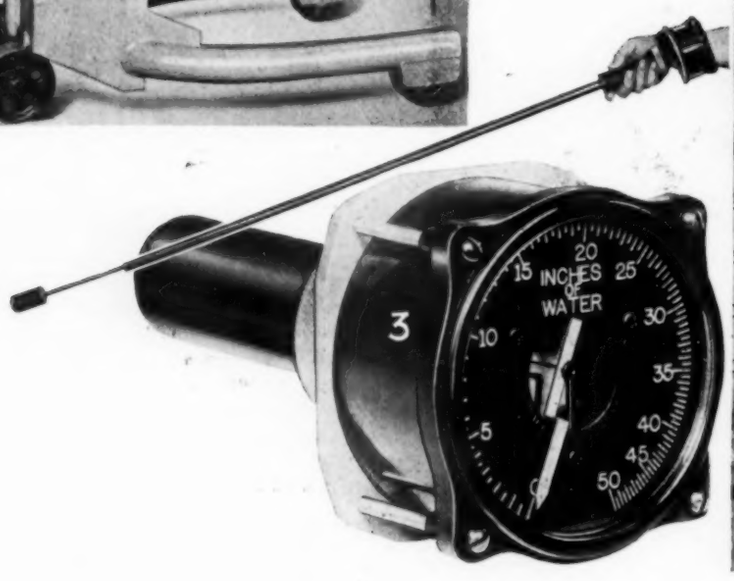
NEW EQUIPMENT and SUPPLIES

(1)—Portable Crane: Hill Acme Co., 6400 Breakwater Dr., Cleveland 2, O., announces a new line of portable cranes for handling loads where overhead lifting equipment is not available. Made of welded steel, they weigh less than half as much as previous models. Two-speed operation is provided by means of a single or double cable for light or heavy loads. Adjustable extension handle gives additional leverage for extra heavy loads. A self-locking worm mechanism holds the load at any point. The cranes are available in models of 1 to 3-ton capacity.

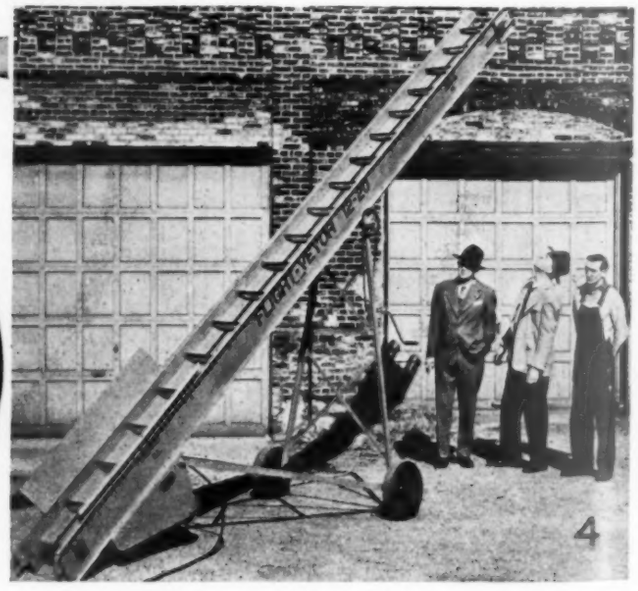


(2)—Air Separator: Swartwout Co., 18511 Euclid Ave., Cleveland, 12, O., is offering a new separator for removing moisture, oil, scale, etc., from compressed air. Utilizing the centrifugal principle, air at the inlet is diverted to the inner wall of the round body and unwanted substances whirl out of the air stream and drain to the bottom. Cleaned air may be taken off horizontally or vertically from pipe-tapped ports. An integral float-operated trap releases condensate automatically. Separator is made of high-tensile iron, interior parts of corrosion-resisting materials. Bottom is easily removed for cleaning. The unit is available in three sizes.

(3)—Gas Pressure: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich., has developed a portable determinator for rapidly ascertaining gas pressure created by molding sand or cores near the metal-mold interface. It uses a 1⅛ x 3-in. sand or core specimen, either dried or green, which is attached to the stem of the determinator and then immersed in molten metal. Gas pressure created is shown on the determinator gage in inches of water pressure. The system is said to simulate mold conditions almost perfectly. A special pedestal, furnished with the determinator, contains a hole to receive a specimen tube ¼-in. OD x 7⅛ in. long. End of this tube projects 2⅞ in. above the pedestal so that open end of the tube is ⅛-in. from the top end of the rammed specimen. The tube with the specimen on one end then is inserted into the lower end of the determinator, and a heat resisting gasket makes a gas-tight joint. Tightness of the joint is adjusted by turning the determinator handle. The specimen on the end of the tube then is immersed 2½ in. into a ladle of molten metal and a reading taken. Net weight of the unit is 5 lb.

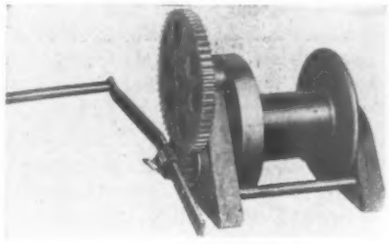


(4)—Conveyor: American Conveyor Co., 1115 West Adams St., Chicago 7, Ill., announces a portable electric conveyor designed to handle materials where height is a problem. It is built to fit any machine in the company's line. With the new unit it is possible to raise the conveyors over 12 ft., facilitating the working of stock piles in coal yards, loading and unloading of materials from box car to bin or loading platform, and stacking of bulk and package material. It will



carry a load of 1500 lb. Features include a T iron frame, safety stop, sprocket and roller chain winch, pneumatic tires and roller bearings.

Winch: American Hoist & Derrick Co., St. Paul 1, Minn., announces an all-steel, hand power winch, of 5-ton capacity, 16½ x 15½ x 16¾-in. in dimensions. Consisting of a drum mounted between two side frames, rigidly held together by two threaded shouldered tie



bolts and a stationary drum shaft, the drum can be driven through 27:1 double reduction gears for heavy loads, or 4.5:1 single reduction gears for light loads. Winch is equipped with removable crank, adjustable from 10 to 20 in., which can be applied for either reduction by inserting in either socket. Weight of the winch, exclusive of crank assembly is 95 lb, crank assembly 7½ lb, and tail yoke 5 lb.

Temperature Control: Foxboro Co., Foxboro, Mass., has developed an automatic recording controller for batch-type processes and operations where rate of temperature increase or decrease must be controlled. By ad-

justments of four setting knobs on the instrument panel, all steps of a complete process cycle may be controlled and recorded, eliminating the use of time-cams or supplementary instruments. By refer-

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ANALYZED INGOTS
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For Casting
sand
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CLEVELAND 13, OHIO

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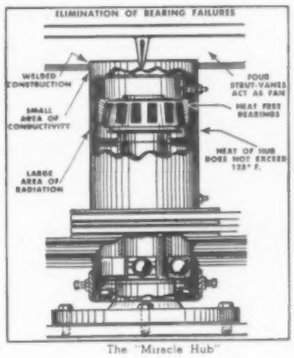
Centrifugal Casting News

Vol. 3 — CENTRI-MECO of KALAMAZOO — Feb. '46

Continuous High Production *with* MIRACLE-HUB Construction


ELIMINATION OF BEARING FAILURES
WELDED CONSTRUCTION
SMALL AREA OF CONDUCTIVITY
LARGE AREA OF RADIATION
FOUR STRUT-VANES ACT AS FAN
HEAT FREE BEARINGS
HEAT OF HUB DOES NOT EXCEED 125° F.
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CENTRI-MECO **Miracle-Hub** construction provides smooth, vibrationless, continuous operation to produce superior centrifugal castings faster! The **Miracle-Hub** is heat-free during continuous use of the machine with permanent molds attached directly to the heavy table mounting-plate of the spinning head.

This unit is engineered so that the temperature in the bearing area never exceeds 125° Fahrenheit. Strut-vanes of the heavy table act as a fan to dispel excess heat radiated above top bearings . . . rigid welding provides great strength and permits relatively small points of contact of table and hub, thus, a small area of conductivity of heat. The outstanding features of the **Miracle-Hub** can be adapted to Custom-bilt centrifugal casting machines to fit your particular need. Send blueprints for Engineering Estimate.

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ence to the instrument chart and its notations, any cycle can be exactly duplicated as desired.

Welding Hammer: Atlas Welding Accessories Co., 14824 Wyoming Ave., Detroit 21, Mich., offers an improved all-metal ball-pein hammer,

which eliminates the weakness of conventional wood handles for welding uses. Shaped to fit the hand, the grip absorbs shock of hammer blows. Heads are alloy tool steel. Several models are available in a variety of sizes.

Hydraulic Cylinders: Logansport Machine Co. Inc., Logansport, Ind., anounces a complete line of hydraulic cylinders adapted for a wide range of operations involving pushing, clamping, lifting, forcing, holding, pressing, pulling and other power movements. Cylinder barrels are centrifugally cast gray iron, and soft synthetic rings are used instead of conventional gaskets. The cylinders are offered in seven mounting types, three piston rod models and nine standard bores.

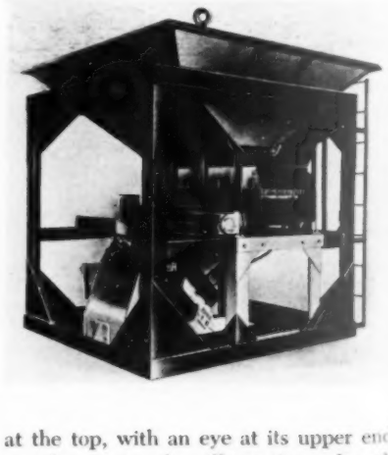
Lift Truck: Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa., announces a new electric truck, compact and easily controlled, can be maneuvered in congested areas, etc. The new truck is claimed to reduce material handling to a minimum. The operator can move loads up to 3 tons by finger tip pressure on dual controls under the bar grip. Controls return to neutral and shut off power when finger pressure is released. Power is obtained from a lead or alkaline battery in a compartment, an integral part of the chassis. The new truck is available in two types: platform arrangement and pallet. The former is designed to handle single unit loads, or multi-unit loads on skids or skid bins up to 6000 lb; the latter to handle loads up to 4000 lb.

Pyrometer: Claud S. Gordon Co., Chicago, has designed a hand pyrometer for temperature readings of molten nonferrous metals, on a direct-reading type dial. Of cast aluminum and brass construction, the unit has a 43-in. stainless steel extension and standard 7-in. tip which permits true readings to be taken below the surface of the metal. It is provided with an Alnico V magnet and 3½-in. scale reading from 50 to 2500 F.

Roofing, Siding: Koppers Co., Tar & Chemical Division, Pittsburgh, has developed a new roofing and siding material, known as Plastipitch, which provides protected metal for railroad, industrial and agricultural roofing and siding. Permanent adherence of the surface treatment makes the material corrosion, chemical and heat resistant and eliminates painting. The treated sheets can be bent and fabricated without harm.

Interval Timer: Electronic Controls Inc., 44 Summer Ave., Newark 4, N. J., announces a new electronic timer suitable for applications requiring highly accurate circuit timing. Time range is from 1 to 120 seconds in increments of one second, accuracy better than 5 per cent. Unit is housed in slope front, steel cabinet, with two dials, one calibrated in single seconds, the other in 10 second steps, for time selection. Dials control tap switches. Pilot light, toggle on-off switch and push-switch are included. Cabinet size is 8 x 8 x 8 in. Tube used is a 2050 thyratron.

Sand Conditioner: Royer Foundry & Machine Co., Kingston, Pa., announces an improvement which expedites movement of its sand conditioner and scrap remover from one molding bay to another. A strong inverted "Y" bar, installed in the center of the unit



at the top, with an eye at its upper end, as shown in the illustration, directly engages the crane hook. This eliminates difficulty in engaging four hooks simultaneously by use of a sling attached to the crane, as was necessary in former models.

NONFERROUS FOUNDRY RESEARCH

(*Continued from page* 101)

ing manganese bronze.

Before the importance of completely removing all steel primers from large caliber cases was understood, occasional contamination caused much trouble. There was the additional fear of antimony contamination from the priming charge. For several months in 1943, cartridge cases were accumulating at the rate of 8,000,000 lb per month. One year later the entire production was being remelted, with a large proportion used for low tensile manganese bronze. Charges of 100 per cent of fired cartridge brass have been found to produce manganese bronze of excellent mechanical properties. Although the difficulty in handling and melting under some furnace conditions often made it advisable to use only a fraction of the total charge as fired cartridge cases, it was very important to know that mechanical properties were not reduced and that in an emergency the total charge could be made of scrap cases. Some typical mechanical properties are given in Table I.

Assists Commercial Foundries

The Nonferrous Section has done considerable work in laying out foundry procedures on pilot castings to assist companies producing castings for the Navy. Since the total production of some of these difficult castings may amount to many thousands, the initial care taken on the pilot castings often results in great savings of money, time and labor. The casting shown in Fig. 9 is a pump body of hydraulic bronze (46B23C) used in PC boats. Although the hydrostatic test was specified at only 200 psi, the rejections on these castings were very large at a time when they were most needed for naval craft. As made in the foundry of the Naval Research Laboratory, the pump castings withstood pressure in excess of 1000 psi, which was the maximum pressure of testing, with no leakage whatsoever. The pump body casting in Fig. 9 has been tipped on its side so that the location of chills (black) on heavy sections may be seen. The casting has been gated into the heavy sections which are surmounted by risers of adequate size.

Another type of pilot casting, shown in Fig. 10, is an air ram cylinder 33½ in. long, 14½ in. wide and 9½ in. high. The two cylinder bores which run lengthwise in the casting must withstand 300 psi in a hydrostatic pressure test. The metal specified for this casting is an aluminum-

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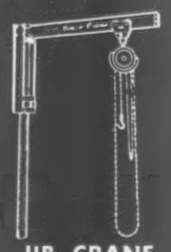

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copper-silicon alloy. The castings produced in the laboratory, made according to principles of good foundry technique, did not leak at 750 psi pressure.

The view has been taken in the work on pilot castings that pressure tightness is closely related to adequate feeding and may be secured by controlling directional solidification. According to this technique, the freezing zone progresses toward the risers so that final solidification takes place in the risers. Shrinkage porosity, instead of being dispersed in critical sections, tends to be concentrated in the risers. The proper location of risers coupled with the use of gypsum insulation, and chills, thus will lead to controlled directional solidification and greater pressure tightness. Proper design of casting, proper sand control, suitable choice of alloy, purity of materials, optimum pouring temperature and good melting technique are implicit in the production of pressure-tight castings. These principles apply to all cast metals.

Current research of the Nonferrous Section of most interest to foundrymen includes studies in melting practice of bronze, the gating of copper base alloys and the radiographic investigation of defects in bronze castings.

Study Effect of Dissolved Gases

In the study of melting practice of tin bronzes an investigation has been made of the effect of dissolved gases on the mechanical properties of the metal. Hydrogen has been added to the molten metal and methods to remove it have been studied. The successful removal of dissolved gases in molten tin bronze produces marked changes in the mechanical properties. Greater density and less shrinkage are also characteristic of degassed metal.

The pouring rate is much more important for some alloys than others. Mechanical properties of tin bronzes are little affected, but manganese bronze and especially aluminum bronzes require very slow pouring for best mechanical properties. Fast pouring of aluminum bronze is most harmful in castings of a design such that heavy risers are not practicable over the entire horizontal cross-sectional area. In a particular casting the variations in the mechanical properties of aluminum bronze from 35000 psi tensile strength and 3 per cent elongation to 80,000 psi and 32 per cent elongation were caused by changes in the velocity of pouring. Dross was much more prevalent on the surface of castings of low mechanical properties.

Defects in bronze castings, whether resulting from gas entering the metal during the melting or from shrinkage resulting from incorrect gating and risering, are easily detected by radiographic examination. This type of flaw detection has been a very valuable tool in steel foundries, but has been far less used by the manufacturers of bronze castings. The aim of the present work with tin bronze is to correlate defects with mechanical properties and pressure tightness. At the present time methods have been found to control the type and severity of the defects by suitable foundry practice. Plates of tin bronze 1 x 6 x 8 in. have been prepared showing gradations of severity in shrinkage, gas porosity, hot tears and dross and sand inclusions. The most difficult part of this work was to produce single defects without the presence of other types of defects at the same time.

In addition to investigations of cast metals, including melting practice, gating and risering technique and radiographic standards, even more important work is in progress on various new alloys with better resistance to corrosion, higher mechanical properties at elevated temperature, and good electrical conductivity. Some of these alloys are for both castings and forgings and have application in highly specialized equipment.

The great importance of nonferrous castings to Naval technology can be attributed to the fortunate combination of properties present in many cast nonferrous alloys. Suitable mechanical properties are frequently insufficient qualification when the alloys are to be used in direct contact with moving sea water. Corrosion resistance is in this case a major consideration.

Metal Resists Corrosion

One of the best corrosion resisting copper base alloys for this purpose is manganese bronze. It is well known as a universal alloy for marine propellers. Manganese bronze has the tensile strength of mild steel in addition to excellent resistance to corrosion and cavitation in moving sea water. The tin bronzes, although lower in tensile strength, have even better general resistance to corrosion and are better adapted to castings of intricate design.

The determining factors in the use of copper base casting alloys for other purposes may be high strength at elevated temperatures, good electrical conductivity combined with high strength, nonsparking characteristics, low coefficient of friction, good age hardening properties—just to mention a very few properties by which copper base alloys for Naval use may be classified.

The chief advantage of cast aluminum alloys lies in the high strength which is important in both Naval and aircraft construction. In general, the aluminum alloys are much less resistant to all types of sea water corrosion than are the cop-

per base alloys. Although many of the nonferrous alloys have little competition in highly specialized applications, nevertheless a constant effort is being made through research at various Naval laboratories to improve the alloy or replace them with better ones. This naval research is carried on in close co-operation with metallurgical laboratories of industrial plants.

The research on nonferrous castings has gained great impetus during the war and there is no longer an imaginary barrier between laboratory and foundry. New alloys have been made, new foundry techniques devised and more accurate fundamental knowledge of the behavior of nonferrous metals has been gained. The widespread interest in current research points to much better understanding in the future of the proper place of metallurgical laboratories in the foundry industry. The work in these laboratories does not serve its most useful purpose until it has been made public and, it is hoped, put to practical application in foundries which are producing castings for the Navy.

The opinions and assertions contained in this article are those of the author and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

Labor Distribution Analyzed

National Founders Association recently made a study of the distribution of workers among the various departments of foundries. Purpose of the study is to enable foundry operators to compare their labor distribution with a representative group in their own field. Similar comparisons are being made covering nonferrous, steel, malleable and gray iron foundries.

In the following table, covering all types of foundries, the labor records of 235 plants are broken down to give the percentage of total employees in each of the various classifications shown:

Molders	17.9%
Coremakers	8.5
Cleaning Room	15.0
Melting	5.1
Foundry Labor	13.8
Yard and Miscellaneous Labor	4.3
Shipping	2.2
Maintenance	5.1
Annealing	1.2
Heat Treating	0.5
Engineers	0.4
Patternmakers	2.7
Clerks	2.2
Foremen	4.1
Supervisors	1.0
Superintendents	0.7
Others on Foundry Payroll	15.3

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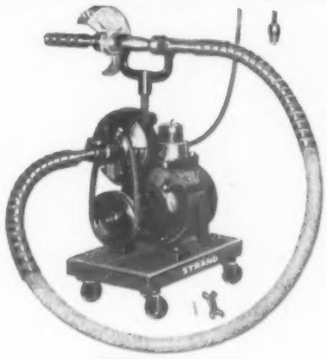

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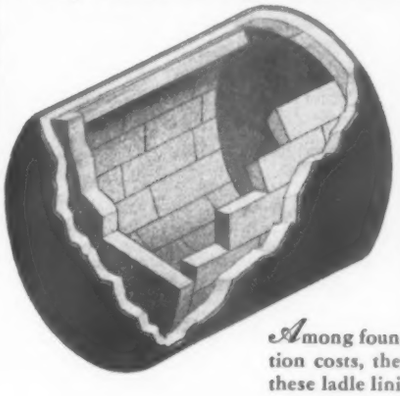

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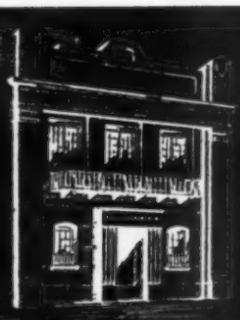

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AEI

CONTROLLING GRAY IRON QUALITY

(*Continued from page* 90)

varied considerably from week to week but the average rejection for the first foundry ran about 15 per cent while the new source averaged about 9 per cent. Neither had perfect control but it was apparent that the quality from the second source was much better than from the first. Such curves are illustrative of the degree of quality control in a foundry.

Let us now discuss these items more in detail and in the order given. First, the casting salesman should sell his company only on a product it can make. Do not take orders for castings when you are not in position to meet the specifications. Do not depend on the words "commercial casting" to cover quality. A commercial casting for a sash weight would not be acceptable for a hydraulic casting. High quality costs money; get your price for it. Much of the dissatisfaction with gray iron casting is caused by lack of mutual understanding. Without it, a foundry is never in control as far as that customer is concerned.

Seller and Buyer Get Together

Good relations and a technical understanding should be established between the foundry and customer as soon as possible. These are ideal when the customer's engineer will go to the foundry with prints or a model of a new part he is designing and discuss with the foundry its mechanical requirements and how it should function. The foundry then has an opportunity to examine the design and inform the engineer of any details that may make the part difficult to cast. By this contact the engineer finds out what the foundry problems are and in the future can design more understandingly. Here dimension limits can be decided upon, the amount of finish desired and the physical characteristic of the iron.

We have now arrived at an understanding with the customer as to the main points of quality control desired. After patterns are made and samples are submitted there should be a conference with the tool designers as to location points, care being taken to see that they are not on parting lines, or that a V-block does not locate at one side on a cored surface and the other on a mold surface. Usually, they should be on the part of the casting in the drag. Many a good casting has been scrapped because such points were not decided on in the first place.

On the other hand, there are numer-

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ous cases where foundries take a pattern knowing that they will have trouble but are too proud to admit it and unwilling to comment to the customer, from fear of losing face, on the difficulties offered by his pattern, when slight changes might improve the quality and be advantageous to both parties. Thus the first step in quality control are the preliminary contacts and understanding. This is part of management. In the corporation for which I work, we try to have these understandings between our own divisions, and also when we buy castings from the outside foundries.

The next step is to have good pattern and equipment control. It is needless to state that without it satisfactory castings are difficult to produce. If the foundry knowingly accepts poor patterns from a customer it is your responsibility; and if you improperly mount a good pattern it is also your responsibility. You must have good pattern control for good quality. This also applies to the operation of the molding and core machines that take the patterns. The mechanical equipment must be inspected frequently and kept in proper adjustment. A worn bushing in a flask or sloppy drawing guides will scrap a casting. Shifts, ram offs, swells, etc. may all be caused by improper mechanical control.

Pay Attention to Cleaning Room

While we are discussing the mechanical controls, let us mention the machines in the cleaning room also. The shot or sand blast rooms must be in good order so that the castings can be cleaned satisfactorily. Is the ventilation sufficient to carry away the dust so that it will not cushion the effect of the shot or the stars in the tumbling mills, and can the operators see what they are doing? If working conditions are not good, the men will not do good work. This applies to each piece of equipment in the cleaning department, whether it be for blasting, chipping or grinding. Poor grinding wheels and poor chipping hammers have been the cause of much unsatisfactory work.

The next in line of equipment control are the fixtures and gages. Each is a factor in the quality equation, and any variations in any piece will reduce control. The core setting fixtures and gages for the molds, the filing and grinding gages for the core and the location targets must be watched closely and kept within limits. It often happens that there is lack of control because such gages and fixtures are not provided. The more complicated the casting and the closer the limits, the more necessary are fixtures and gages. About 15 years ago the automobile engineers specified that the combustion chamber of automotive cylinder heads should be held within a

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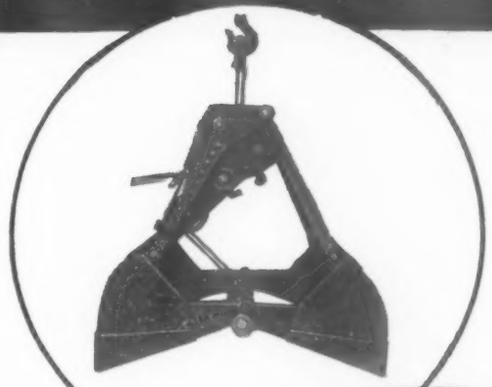

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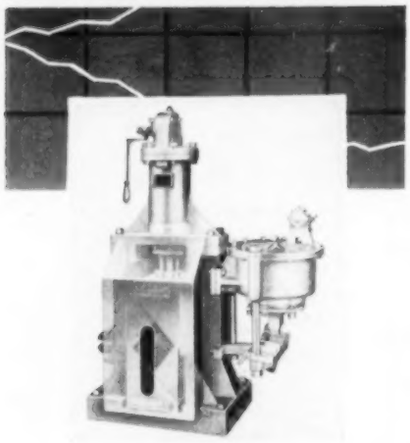

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±0.01-in. and the volumes should be kept within close limits. The cylinder head of an 8-cylinder L-head motor is a long thin casting that is prone to warp one way or the other; yet after the lower surface is finished the volume of each combustion space must be within 3 cc in order to have equal compression. Few companies machine these combustion chambers, so the foundry work must be accurate. We objected a lot at the time but now most of our foundries can hold to these limits without much difficulty. Provision is made to meet these requirements and they become a routine matter.

Up to now we have covered the factors that lead up to the making of the casting, the preparation necessary before starting our foundry production. Next, let us get together our materials—the pig iron and scrap, the coke and limestone, the sand and clay, the core oil and dry binders, the chaplets and core wire. Take any of these items and think of the trouble they have caused in the past because they were not satisfactory for the job. Each one must be right to maintain control. The responsibility of specifications for the various items may rest with the metallurgist, or the department superintendents, or the management, according to the particular organization, but in each case there should be a definite specification sufficient to let the purchasing department know what to buy and the vendor what to furnish. The operating department must be furnished uniform materials if it is expected to produce uniform quality castings.

Need Close Cupola Control

Now that we have our casting orders, patterns, equipment and materials, let us get ready to make some castings. We will assume that all the foregoing items are accurate and correct to specification.

First, let us take up the melting. We have the material and know the physical characteristics desired for the casting. The metallurgist has specified the metal mixture to furnish them; but this does not insure good quality. The cupola must be properly lined and the coke bed properly burned in; then accuracy must be used in weighing in the different ingredients for the charge; but for uniformly good iron we must do more. In our automotive foundries we find we get better results if we clean the sand off the gates and sprue, and we find that it is not best to put in a whole cylinder block with scrap or large bundles of steel. We are getting casting breakers and demanding small steel bundles and not too large pieces of steel, for uniformity of melting. If for any reason we have to vary our melting rate we must vary the mixture in the charge, for we pick up more carbon from the coke when we melt more slowly. This means watchful supervision.

The blast must be kept under control to suit the melting rate and also the atmospheric conditions. Many foundries are finding it worth while to control the moisture in the blast and have put in air drying equipment. Without it, or other adjustments, a change in humidity might spoil a lot of piston rings or wreck a lot of tools in a machine shop when they hit on chilled spots in small sections. We take chill tests from each ladle and try to adjust the metal to suit the casting to be poured. Temperatures are also checked, for if the metal is poured too hot or too cold it may easily cause a defective casting. The rate at which metal is poured into the mold is likewise important.

To review some of the points that may affect the metal: they are the raw material, its size and condition, and proportion, the melting rate and temperature and the nature of the blast and finally, the temperature of the metal and the pouring rate. Each of these items must be checked by a competent man with good judgment and accurate equipment.

Tensile May Be Misleading

While on the subject of iron, I want to mention one item of specification quite commonly used that I think is a mistake; that is, specifying iron by its tensile strength. Recently a man told me he had to have a 50,000-lb iron for a certain casting. The section of this casting was about 2-in. square, and he thought that he would get 50,000-psi tensile strength in that section instead of 50,000-lb tensile in a small-diameter test bar. Cast iron is not a high tensile metal like steel and malleable, and the use of tensile strength in specifying it is tendency to put it in a class where it does not belong. We usually use cast iron for other reasons than tensile strength; we use it for wearability, machinability, hardness, compression strength, density, etc. Accordingly, we should specify for the characteristics we desire and not mislead ourselves and others into assuming that the tensile strength of a test bar represents the strength to be expected in a heavy casting. A tensile specification may be an indication of the metal wanted but it is not a comprehensive measuring stick, and seldom does it describe the characteristics we want in the casting.

From discussing the metal we will take up molding. We have already considered the pattern and molding machines, so all we have left are the flasks, the sand and the workmanship. Let us assume that our equipment and labor are satisfactory and consider the sand.

It must be of the fineness to give the surface desired, the permeability to carry

off the gases and the strength to carry the load and not permit swells and drops. The moisture must be held within a very close range to maintain these features; the grains must be properly coated with the clay but not have enough excess to ball up. To do this we must have good mixing and blending each time it is used, with just the right amount of moisture and bond added each time. Some of our plants have paid a straight rate for the sand mixers and added a bonus if they kept it within fixed moisture limits.

Sand should be checked frequently for moisture, strength and permeability. The castings will tell you when it is right. They will also tell you when it isn't. When the sand is constant, the number of jolts and the amount of squeeze will also remain constant. With good materials and equipment less judgment is required of the workman and the training period is shorter. But he should be thoroughly taught each motion of his job and the reason for it, and his work kept to that standard. Core setters should be trained in the setting of cores and the use of gages. A poorly trained foundryman can usually spoil more work than a poorly trained machine operator in a machine shop, and his errors are harder to trace; they may not be discovered for several weeks. The pourers also must be instructed in the art of pouring molds and watched to see that they do it properly. Improper pouring has spoiled many castings, so pouring must go on the list of control points.

Arrange Cooling Period

Cooling of the castings is another process to watch. Some castings have to be placed in a furnace after shake-out in order that they may cool uniformly all through and not crack. Variations in the hardness and also in the graphite structure are affected by how the castings are allowed to cool. In some cases quick cooling meets the customer's quality requirements better, and for other castings slow cooling is more satisfactory.

While the castings are cooling we will look into the core department. Here close control is also needed. Care must be used in the selection of the oil and other binders. The manager of one of our large foundries said to me: "You can change anything else you want to, but don't change my core oil." Selecting the best oil and then keeping it uniform was a vital necessity for his control. The whole sand mixing process must be closely held. Some foundries do not leave the mixing to the operator but automatically feed the ingredients to a hopper on the scale which is controlled by an electric eye pointed at the scale dial. In order that a coremaker may not get the wrong mixture some are considering using dif-

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ferent colored sands for different mixtures. In order to blow cores satisfactorily, it is necessary to control the moisture in the sand. This is held to within 0.2 of 1 per cent.

Each operation in making and venting the cores must be watched and the baking time and temperature controlled. This is not difficult with continuous ovens but requires watching with the batch type. Cleaning, jigging and assembling also require close supervision, and if cores are put in storage be sure to keep them dry.

By this time our castings have cooled and reached the cleaning department. Here, as shaken from the mold, they are cleaned and ground and made usable. But there are varying degrees in the requirements of the customer. Be sure to learn what they are in the first place. An oil passage in a hydraulic casting must be free from sand. Complaints and serious losses have been experienced because sufficient attention was not given to this work. Often foundries have agreements with the customers to do less finishing on surfaces that are to be machined and sometimes small fins are not objected to when the cutting tools will remove them later. Grinding and chipping are necessary but many a good casting has been spoiled by a careless grinder. Use gages where they will be useful in grinding castings. It is a pity to have a casting pass successfully through the many control points and then have it made into scrap because a grinder used too much pressure on a locating point.

Salvage By Welding

Where it is economically advisable defective castings should be salvaged, usually by welding, but care should be taken to see that the welding department does not become a production department and because of it the production departments reduce their vigilance. When welding is done it should be to the satisfaction of the customer.

Now as to scrap records. Often these are slips of paper that accumulate from day to day on the superintendent's desk. Management and the operating staff will get a better picture of the scrap situation if the quantities and percentages are plotted on a curve each day for each troublesome pattern and the reason for scrapping indicated. They can then tell at a glance whether their control of quality is improving or not and where the opportunities for improvement are greatest. If the difficulty is in the design, the foundry should not hesitate to discuss it with the customer. He has to pay for the scrap eventually and it is to his advantage to know if his design is not economical to make. If the fault is in the foundry, then the remedy is up to the foundry. The height and slant of these curves will be a constant indication of how the control of quality is working out.

After discussing the design, the equipment and materials used in making good castings, let us consider the workmen and their contribution to quality. One can buy the best material possible, put in the most modern equipment, spend fortunes on pattern and gages, but a poor workman can wipe out the results of the investment. A good workman with poor equipment will do better work than a poor workman who has good equipment.

Up to recent years, foundry work was a craft that required long training and skill in order to make castings. The molder studied the pattern and planned his work so that the casting might be perfect. He knew from past experience how to mix his sand, gate the pattern and ram up the mold. He also felt that he alone would know how to pour it. After pouring, he would shake it out of the sand and study the results of his planning and work. He took a personal interest in every detail.

Machines Do the Thinking

In our mechanized production foundries we have done the thinking for the men and only ask them to go through certain motions to perform the simple operation. In the core and molding departments very often the operator does not know the name of the casting he is working to make or even what it looks like or its purpose. He is given no incentive for pride in his accomplishment; he does not know what his work is for; there is nothing to think about. After his movements have become mechanical he becomes little more than a robot. If we can give him some insight as to the value of foundry work, the use of the piece he is working on and the value of his work to the ultimate casting, he will take more interest and pride in his work. The results will make it easier to maintain quality control. There are some foundries doing outstanding work along these human relations lines.

In conclusion, I feel like paraphrasing St. Paul and saying, "And now abideth material, equipment and workmanship, but the greatest of these is workmanship."

Quality control is not something that one can obtain by waving a magic wand or by getting a better metallurgist. It must be the aim of management and each department executive and the aim of every workman. Each employee contributes to it.

Someone said, "Eternal vigilance is the price of liberty;" let me change it and sum up the subject by saying, "Eternal vigilance in every detail is the price of quality control."

NEW TRADE PUBLICATIONS

FIREBRICK: The Ironton Fire Brick Co., Ironton, O., offers a 52-page catalog containing analyses, illustrations, sizes and tables for use of standard stock firebrick available for cupolas, by-product coke ovens, open hearths, glass furnaces, lime kilns, boiler settings, malleable furnaces, etc. General information about firebrick, size deviations, tables of mensuration, tables for use in designing special radial type brick, melting points, furnace temperatures, temperature conversion tables and weights of various materials are included in the book.

AIR MOTORS: A 14-page folder describing a variety of versatile reciprocating air motors is offered by the Bellows Co., 861 East Tallmadge Ave., Akron 10, O. Compact nature and integral control features of the motors are illustrated. Synchronization may be effected by direct linkage, by cam, or by solenoid actuated by micro-switch, cam or electron tube. Dimensional drawings, accessories, pivot mount dimensions and standard and special stroke lengths available are described.

INDUSTRIAL PAINT: "New Concepts of Color," a technical bulletin recently published by McDougall-Butler Co. Inc., Evans, Water & Norten Sts., Buffalo 5, N. Y., gives interesting facts about modern color engineering. Many questions concerning proper lighting, through the use of color schemes, with photographs, showing effective results, are depicted.

SWING TABLE: American Foundry Equipment Co., 555 South Byrkit St., Mishawaka, Ind., has published a catalog, No. 214, containing detailed information about its new swing table which utilizes an airless abrasive blasting unit for cleaning a wide range of work formerly cleaned in air blast rooms. The machine comes in four sizes, from 24 to 86 in. in diam.

ALUMINUM ALLOY: National Smelting Co., 6700 Grant Ave., Cleveland 5, has available a bulletin which describes the advantages, mechanical properties and recommended applications of a high quality, general purpose aluminum alloy. Properties of the alloy are substantially the same as the 355 and the 356 type.

ABRASIVE: A colorful 4-page circular, published by Norton Co., Worcester 6, Mass., contains complete information about a new abrasive for dies, gages, anvils, etc., said to be the hardest material available for commercial use. The circular gives a history of its production and uses as well as tables showing comparison of hardness, electrical resistance, resistance to compression, thermal coefficient of linear expansion and identation measurements.

ARC WELDING MACHINES: Air Reduction Sales Co. Inc., 60 East 42nd St., New York 17, has available a 16-page illustrated booklet describing alternating current transformer arc welding machines which include 300 and 500 ampere standard all-weather models, as well as a new 200 ampere machine, designed to meet

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WHEEL DRESSING TOOLS: A new 16-page catalog, No. 45, has been published by the Desmond-Stephan Mfg. Co., Urbana, O., which describes and illustrates a complete line of wheel dressing tools including grinding wheels, dressers and cutters. Advice concerning the various types of dressers is furnished, reasons for selection, as well as prices and sizes. Dimensions and prices of repair parts are included.

REFRACTORIES: Chicago Fire Brick Co., 1419-1467 North Elston Ave., Chicago 22, Ill., has published Bulletin No. 845 which describes refractories for industrial furnaces. Cross sections are shown of suspended arch adaptation to merchant mill construction as well as tile suspension applied to a rotary type forge or heating furnace. Suspended insulated walls for recirculating ducts at top of furnaces are illustrated and the details of securing tile, obviating the necessity of using casing plates in construction of furnace wall, is explained.

X-RAY DIFFRACTION: North American Philips Co. Inc., 100 East 42nd St., New York 17, has published an illustrated booklet covering the basic theory, principles and applications of X-Ray diffraction, the constitution of matter and treatment of application problems. Technique of powder identification, advantages of the new x-ray spectrometer, low-angle scattering, alloy formation, catalysts, studies of mineral substances, heat exchanger problems, and high polymer work, are among the subjects discussed in the new 16-page booklet.

CYCLOGRAPH: Allen B. DuMont Laboratories Inc., 2 Main Ave., Passaic, N. J., has published an interesting bulletin which covers a cyclograph technique for the 100 per cent nondestructive inspection of materials and finished pieces in accordance with given metallurgical specifications or requirements. Use of the machine includes inspection and automatic sorting and feeding of machined parts, guaranteed uniform machinability of malleable castings, inspection of monel welding rods of mixed analysis, sorting of rocket tubes, etc.

MATERIAL HANDLING: "Clark Carloader Method," a new 16-page booklet issued by Clark Tructractor Division, Battle Creek, Mich., crystallizes the basic principles of modern mechanized material handling, approaching the subject analytically, from the aspects of top management, purchasing agents, production engineers, sales managers and transportation executives. As an essential phase of planned production, the booklet will prove helpful and interesting.

EXHAUSTER: Air Devices Inc., 17 East 42nd St., New York 17, has available Bulletin EX-101, which gives technical data for a wind-actuated, weatherproof exhauster that can be mounted vertically or horizontally on building tops, and vents to suck hot, stale air, steam or odors from the building when a slight breeze is blowing from any direction. The exhauster has no moving parts, is of steel construction, corrosion-resistant and weatherproof. Easily installed on any stack or suitable base.

CHAIN BELT: Bulletin No. 45-1, an 8-page folder published by the Baldwin-Duckworth Division of the Chain Belt Co., Springfield 2, Mass., offers detailed description of roller chain features and table of specifications of the more popular sizes with list prices.

STRESS-STRAIN: Bulletin DM-345, published by the Meehanite Research Institute, Pershing Square Bldg., New Rochelle, N. Y., contains design data and an analysis of stress-strain diagrams. Other engineering applications indicating strength and toughness are also described.

FRICTION SAWING: Machine Tool Division, DoAll Co., 1301 Washington Ave. South, Minneapolis 4, offers a new 24-page booklet which describes in detail an improved technique for cutting materials. A Job Selector chart contains a ready reference for selecting proper sawing factors in cutting SAE steel, armor plate, stainless steel, illium, cast steel and cast iron. Photographs show various applications for friction sawing in foundries, experimental laboratories, production, maintenance or salvage work.

VACUUM CLEANER: Bulletin F-4, recently published by Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y., describes a line of portable vacuum cleaners for industrial plants, transportation facilities and public buildings. Dimensions, capacities, power, performance and weights are given for all models and sizes.

TOOL ROOM GRINDING: Macklin Co., Jackson, Mich., has available a 34-page booklet describing two new bonds, V5 and V6, which have been developed for use in the production of milling cutters, reamers, hobs, broaches, thread chasers, taps, twist drills, gages, stellite tools, lathe and planer tools and dies. Complete information and specifications for all types of tool room grinding and surface grinding jobs are given.

INDUCTION FURNACES: Ajax Electrothermic Corp., Trenton 5, N. J., offers a 16-page bulletin, No. 26, which describes high-speed, precision melting of nonferrous metals in both lift-coil and tilting-coil types of furnaces, in sizes from 120 lb capacity up, powered by efficient motor-generator units from 50 kw up.

TUBE FURNACE: Burrell Technical Supply Co., 1936-42 Fifth Ave., Pittsburgh 19, offers Bulletin 459, which outlines features of tube furnaces for temperatures up to 2650 F, dimensions in inches, specifications and prices. The furnaces are supplied complete with transformer, pyrometer and all other necessary accessories, except combustion tubes, for operation on 115 or 230 v, 60 cycles, as specified. Bulletin 201, supplies complete information on combustion tubes for use in all types of tube furnaces.

WASHINGTON *Notes* ★★★

MAGNESIUM castings have experienced the sharpest decline in demand of various foundry products since end of the war, figures of the Bureau of Census show. September shipments of magnesium sand castings totaled only 137,000 lb, compared with 1,820,000 in August and a monthly average of better than 6,000,000 lb the first five months of 1945. September deliveries of 13,000 lb of permanent mold castings reflect the termination of production of incendiary bomb castings which contributed heavily to monthly shipments of as much as 17,000,000 lb of this type of casting during the war. The bureau reports unfilled business in magnesium sand castings as of Sept. 30 totaled nearly 2,600,000 lb.

★ ★ ★

Aluminum casting shipments have slipped relatively less than magnesium. against 20,900,000 *in August and a wartime peak of* 49,500,000 *in March,* 1944. *September shipments of cylinder head castings were less than* 100,000 *lb, compared with a wartime peak of around* 13,000,000 *lb.*

★ ★ ★

THE LABOR Department thinks foundry employment the next two years will average about 50 per cent higher than in 1939 and approach the peak war year 1944 figure of 425,000 workers. A bureau survey says the foundry outlook is more favorable than that of many other metalworking industries.

★ ★ ★

The Civilian Production Administration, successor to WPB, has closed all its field offices. All applications for priorities assistance now must be forwarded to CPA headquarters in Washington for handling, but priority application forms are being made available at 115 *first class postoffices and at field offices of the Smaller War Plants Corp. At one time WPB had a field force of* 6000 *to* 7000.

★ ★ ★

TO ASSURE equitable distribution of pig iron, users in the northeastern states have been advised to hold their purchases within the 30-day inventory restriction. CPA says there also are indications of inventory violations in other sections of the country and that stricter controls may be necessary. A factor in the situation is the decline in pig iron production of more than a million tons monthly from the wartime peak of well above 5 million tons.

OPA has merged its ferrous and nonferrous castings sections, with Joseph B. Meier, formerly head of the latter, in charge of the combined group. C. D. Scully Jr., at one time in charge of the iron and steel scrap and castings section, has transferred to the Reconstruction Finance Corp.

★ ★ ★

PRODUCTION of cast iron soil pipe and fittings, one of the bothersome points in the stimulation of building castings, is increasing but has yet to reach the 40,000-ton monthly average that is believed necessary for 1946. November output was about 22,000 tons, against 19,000 tons in October and 16,000 in September. Capacity of the foundries operating recently is placed at approximately 46,000 tons a month, provided sufficient manpower is provided.

★ ★ ★

Prior to the war 52 *foundries employed* 11,000 *people and produced* 565,000 *tons of cast iron soil pipe in* 1941. *In* 1944 *there were only* 32 *plants—working at* 30 *to* 40 *per cent of capacity—and production was down to* 165,000 *tons. Early last December* 39 *foundries were operating, one expected to start production shortly, nine "as soon as possible," and the remaining three stated they did not intend to resume soil pipe work. As of the end of October foundries in operation had* 4672 *workers, and although this had risen to about* 5000 *by Dec.* 1, *an additional* 2200 *men were needed.*

★ ★ ★

HALF the total government property expected to be surplus by next June will consist of aircraft and aircraft parts which originally cost more than $17 billion. Consisting largely of obsolete combat planes, this equipment is practically useless in civil aviation and has only scrap value. The scrap disposal program calls for large fields where obsolete bombers and fighters will be lumped into a gigantic "mine above ground." This mine will be "worked" as the metal can be absorbed by the market.

★ ★ ★

OPA has liberalized one provision of its order of last Sept. 15, *under which individual company price adjustments other than reconversion adjustments were authorized. Formerly one of several plants or corporations under common ownership might be denied relief because the owners could not show overall loss. The new provision permits OPA to give individual consideration to claims involving one or more such operating units.*

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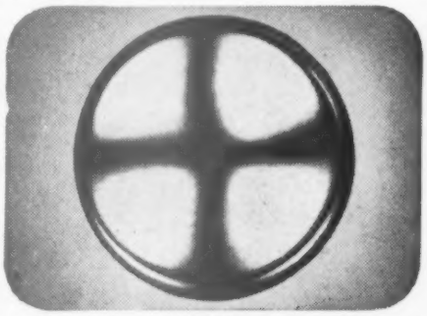

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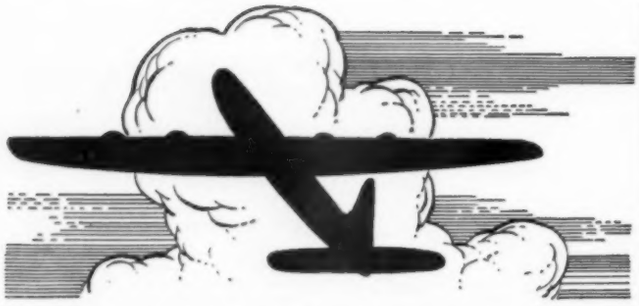

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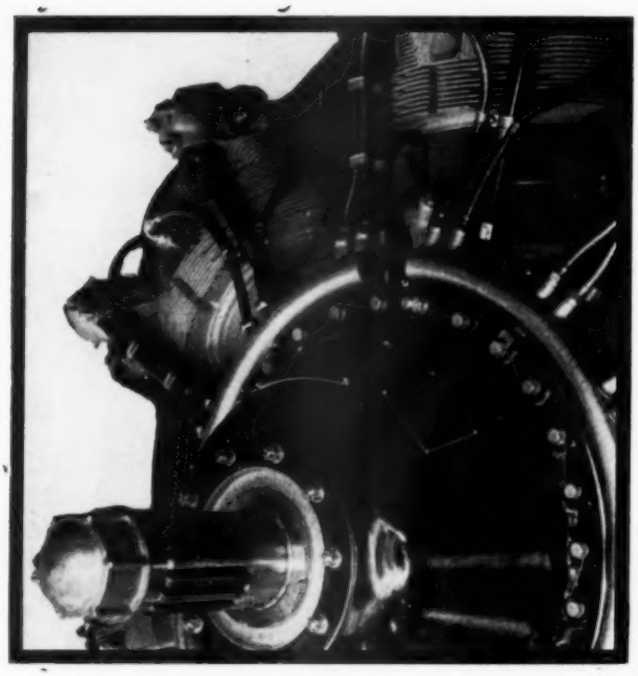

for cleaning and refining aluminum and its alloys, is used in the manufacture of the motors that carry the loads, and the sights that aim the bombs . . .

Many of the intricate aluminum castings that go into motors and bombsights are made with the aid of SOFFELITE ALUMINUM PURIFYING FLUX, because SOFFELITE is guaranteed to produce a tougher, cleaner, denser metal, with less shrinkage and more fluidity, free from aluminum oxide and iron. Manufacturers of airplane motors and bombsights have increased their demands for SOFFELITE to the extent that in some cases we are obliged to supply orders in car-load lots.

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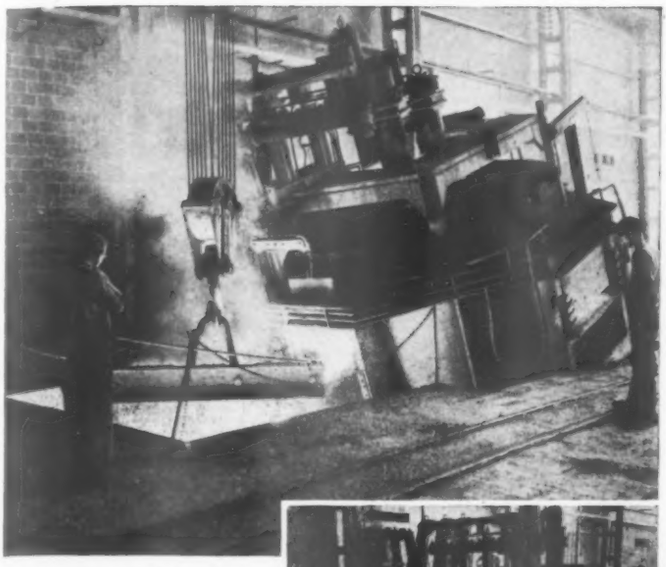

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● The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with air gauge, pop-off gauge and a pin on top of the arm for a gate horn.

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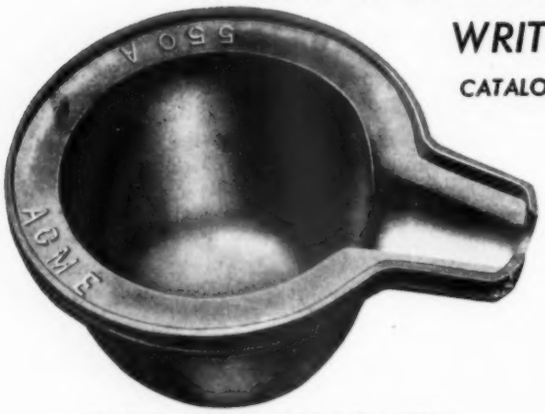
MELTING POTS—Ingot Molds

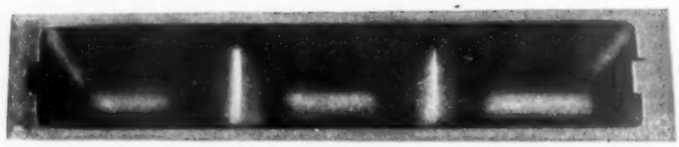
for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.



ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

WRITE for
CATALOG "F"

HOLDING
BOWL NO. HP7001



INGOT MOLD NO. BB-6

Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

ACME FOUNDRY COMPANY

DETROIT 16, MICHIGAN

2502 TWENTY-SECOND ST. PHONE LAFAYETTE 2404

LINE FORMS on the RIGHT!

WE NEED hundreds of 2- and 3-core manifolds for marine engines. They used to be a natural for you fellows—not such finicky stuff that you can find fault with the hardwood patterns and boxes or call it 'custom' work. Three years ago you fellows knocked each other down for this business—and now you mumble about how "tough they are to make, can't get any good ones!"

Oh, bring back the days of Pop McGuiggan! There was a foundry man!

Who of you has the knowledge and desire to handle this business?

OSCO MOTORS CORPORATION

2020 E. Orleans St. Philadelphia 34, Pa.

Foundries Save AIR and TIME with Air-O-chek AIR GUNS

Precision made of bar brass and stainless steel.

No Leaks No Levers No Packing

Nothing to get out of order. Years of troublefree performance without attention. That's why leading plants have bought thousands of AIR-O-CHEKS. Install a dozen and compare results with the best you have ever had. Remember AIR-O-CHEKS have the name stamped in the head. Only AIR-O-CHEKS have the ball and socket connecting the enclosed lever to the valve. Sizes for all requirements. Prompt shipment on high priority.

AIR-WAY PUMP & EQUIP. CO., 405 S. Jefferson St., Chicago 7, Ill.

An Important Message

to the 1103 Foundries Who Plan to Purchase*

SAND RECONDITIONING SCREENS

During the past few years, a large number of leading foundries have installed Seco vibrating screens for reconditioning sand. Day after day, month after month these dependable Seco's have been compiling impressive performance records in every one of these installations. The *big reason* for this is Seco's patented method of mounting the live body to the base frame. This insures 100% screening efficiency over the entire screening surface and not only speeds up screening, but prevents bobbing and weaving no matter how the load is distributed over the screen.

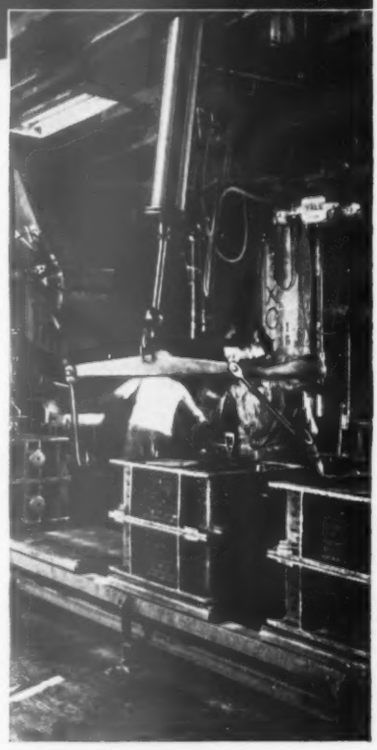
Another Seco exclusive, the auxiliary vibrator, permits *efficient* screening of damp, sticky sand and helps prevent blinding of the meshes.

Every foundry planning to install a vibrating screen for reconditioning sand will want to know more about Seco's ability to give them more and cleaner reconditioned sand and long dependable service with a minimum of attention. This is an invitation to those 1103* foundries to consult Seco's screening experts *now*. Write Dept. G.

Figure obtained from a recent independent survey.

SECO SCREEN EQUIPMENT CO., INC.
9 Lafayette Avenue Buffalo 13, N. Y.

FOUNDRY *Speeds Production* ROUTINE WITH **CURTIS AIR CYLINDERS**



Here's another example of how Curtis Air Cylinders speed up production, make material handling easier, and save manpower for other jobs. Curtis Air Cylinders in this large foundry quickly, easily, and accurately handle heavy molds.

Curtis Air Cylinders and Air Powered Hoists are engineered to meet your individual requirements — designed to handle practically any lifting, pulling, or pushing operations — they are saving time, labor, and cutting costs in hundreds of industries today.

They provide exceptionally accurate control of loads, cannot be injured by overloading, and because of their simple, rugged construction, with only one moving part, they'll stand up under the heaviest kind of continuous service.

It will pay you to send for Bulletin A-4-B, which gives full information.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1922 Kienlen Avenue, St. Louis 20, Missouri

Established 1854

CURTIS
ST. LOUIS
NEW YORK
CHICAGO
SAN FRANCISCO
PORTLAND

G-474
CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1922 Kienlen Avenue, St. Louis 20, Missouri
Please send me Form A-4-B.

Name.....
Firm.....
Street.....
City.....Zone.....State.....

MONEY LABOR TIME

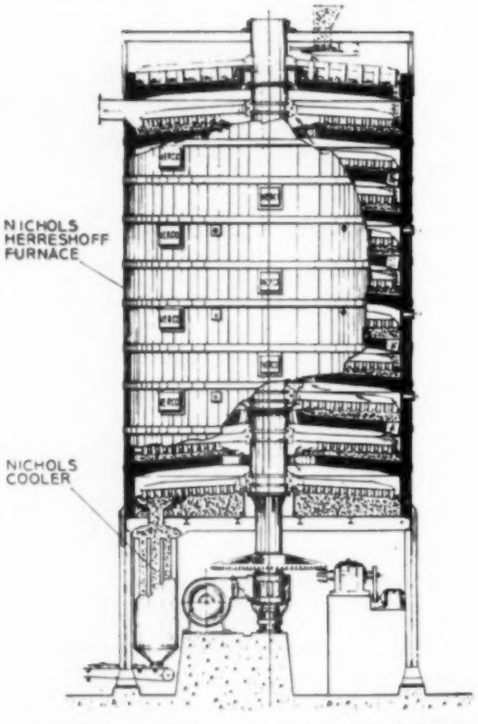
all three are saved by "THE NICHOLS WAY"

OF RECLAIMING FOUNDRY SAND

Clean reclaimed sand—with virtually the same physical properties, color and workability as new sand is always on hand after a Nichols Sand Reclaiming system is installed. Freight, unloading, handling and disposal charges are reduced.

Nichols will supply equipment designed to your needs, either for thermal processing exclusively or in combination with scrubbing or classifying. Units are built in a wide range of sizes to handle large or small tonnage. They are equally efficient for molding and core sand reclamation in foundries producing castings of

Steel — **Malleable Iron**
Gray Iron — **Magnesium**
Aluminum — **Brass**



Ask a Nichols Engineer to give you details on how well-known foundries have saved money through reclaiming sand the simple, economical and dependable "Nichols Way."

NICHOLS

ENGINEERING & RESEARCH CORP.

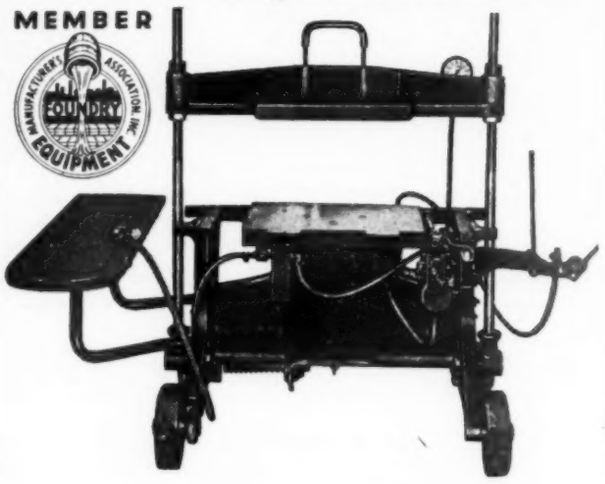
NERCO

60 WALL TOWER
NEW YORK 5, N. Y.

UNIVERSITY TOWER BLDG.
MONTREAL, P. Q.

DEPENDABLE JOLT SQUEEZERS

MEMBER MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

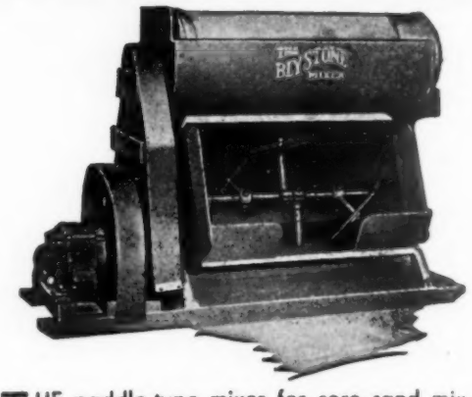


	No. 91	No. 101
Jolt Cyl.	4″	5″
Squeeze Cyl.	10″	13″
Between Uprights	36″	38″

ARCADE MANUFACTURING CO.

Freeport, Illinois

BLYSTONE • MIXERS •



THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for the new Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

EXCELLO

FOR CASTINGS TO MEET NEW NEEDS

"PEEL LIKE THE SKIN OF A HARD-BOILED EGG"

Write us for details and free test samples

BLOOMSBURY QUALITY — an assured standard SINCE 1882

THE BLOOMSBURY GRAPHITE COMPANY, BLOOMSBURY, N. J.

BUSHY FLAME dries large areas quickly—
Gets into hard-to-reach corners!

Gasweld **MOULD DRYING TORCH**

This light, easy-to-handle torch with a big bushy flame that can be easily directed to every corner of the mould, is the modern answer to drying large moulds quickly and efficiently. The bushy flame covers large areas or gets into corners with equal ease.

Operating on pressures as low as 4 ounces, these torches use natural or city gas in conjunction with compressed air. Ruggedly constructed, well-balanced and easy to handle, the torch weighs only 3½ pounds—does not tire the operator.

Use the "Gasweld" torch for efficiency, convenience and safety in the foundry. *Write today for full details and "Gasweld" Catalog.*

WALL CHEMICALS DIVISION of
THE LIQUID CARBONIC CORPORATION
3110 S. Kedzie Ave., Chicago 23, Illinois

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GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE • NEW YORK 18, N. Y.

THIS IS THE MURPHY TYPE A SEPARATOR ★ GUARANTEED

Pipe Sizes ½" to 4"
1 ½" to 4" Made in Steel

YES...

Guaranteed to remove all moisture from compressed air lines, and guaranteed against mechanical defects for a period of two years. Entirely mechanical and automatic. No absorbents or chemicals. No attention . . . No wear.

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Murphy *knows* compressed air. Write for our literature, or state your problem. Our engineers are at your service.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
HAMILTON, OHIO, U.S.A.
Moisture Elimination Up To 3000 Pounds Per Square Inch

The
E. & G. BROOKE IRON COMPANY
BIRDSBORO, PENNSYLVANIA

•

Manufacturers of
BASIC, MALLEABLE, FOUNDRY
FORGE AND LOW PHOSPHORUS
PIG IRON

•

Established 1788

A quick report on temperatures

Foundrymen know what a wonderful difference it makes to have pouring temperatures just right. Now, every nonferrous foundry can have every melt just right, because the job of checking temperatures can be done accurately, easily, quickly.

The Marshall Enclosed-Tip Thermocouple is a modern instrument for modern foundry conditions. Its protected tip can be immersed again and again in molten metals without injury. The electric circuit also is insulated so that a dependable, undelayed temperature reading is always assured.

Write for the descriptive Folder: "A Tip on Foundry Savings". L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio.

MARSHALL
Thermocouples

For
MOST EFFECTIVE BLAST CLEANING

20th CENTURY BLAST

Steel **SHOT, GRIT**

Amazingly **WEAR RESISTANT!**

● You choose a certain size of blast cleaning abrasive because that particular size does a faster, better and more economical cleaning job. But how long does your abrasive hold to that most effective size? An abrasive with greatest wear resistance holds to its size range better and gives you highest cleaning efficiency over a longer period of time.

We suggest you put 20th Century Blast Steel Shot and Grit to the test. Our Exclusive Scientific Heat Treating Process makes it extremely hard and tough.

20th Century Blast is made in many different sizes accurately graded to new S.A.E. Specifications.

IMMEDIATE SHIPMENTS IN ANY QUANTITY

PEENING SHOT

MOST UNIFORM! Closer screened by actual Rotap tests.

Write for FREE Samples and Price List.

The Cleveland Metal Abrasive Co.

Main Office and Plant:
880 E. 67th Street, CLEVELAND 8, OHIO
Howell Works: Howell, Mich.

POPULAR...

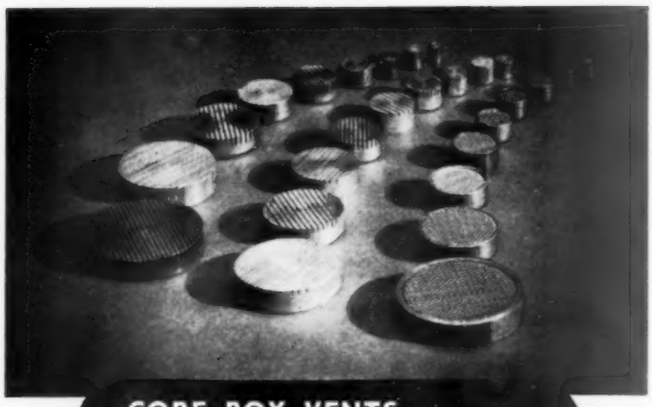
Is the position occupied in the Foundry Industry by

REXALL & SAHARA
Belts.

For handling hot and cold sand, castings, molds, etc. Many of your friends know they are built for the service and that they show high economy.

Write for some names.

IMPERIAL BELTING CO.
1750 S. KILBOURN CHICAGO 23



CORE BOX VENTS TO FIT EVERY NEED

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock!

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SPECIFICATION CIRCULAR ON REQUEST

Wm. DEMMLER & Bros
Kewanee, Illinois
MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

MIXERS

FOUNDRY

Fast, dependable core sand Mixers. Triple mixing hoes assure thorough action. Flared drum for quick easy charging and discharge. Available with replaceable full hard abrasion resisting drum liner at slight extra cost.

WRITE FOR INFORMATION AND LITERATURE ON

CMC FOUNDRY MIXERS
. . . AND
TIPOVER BUCKETS

● *For Sale By Leading Dealers Everywhere* ●

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

ON YOUR WAY, YOU'RE LICKED. WE'VE GOT BIG STOCKS OF SHOT & GRIT AND CAN FILL ORDERS FOR ANY ONE OF 25 SIZES GRADED TO NEW S.A.E. SPECIFICATIONS. OUR PRODUCT IS UNIFORM. TOUGH AND DURABLE. WE WILL BE GLAD TO FURNISH INFORMATION ABOUT SHOT PEENING OR ANY CLEANING OR PRODUCTION PROBLEM. ASK!
WOW
O-O-O-H
HIGH COSTS
WASTE
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PENNSYLVANIA FOUNDRY SUPPLY & SAND CO
ASHLAND & E. LEWIS STREETS
PHILADELPHIA 24 PENNA
WE CAN SUPPLY EVERYTHING IN THE FORM OF FOUNDRY SUPPLIES & WE DO MEAN
"EVERYTHING"

Steel Abrasives

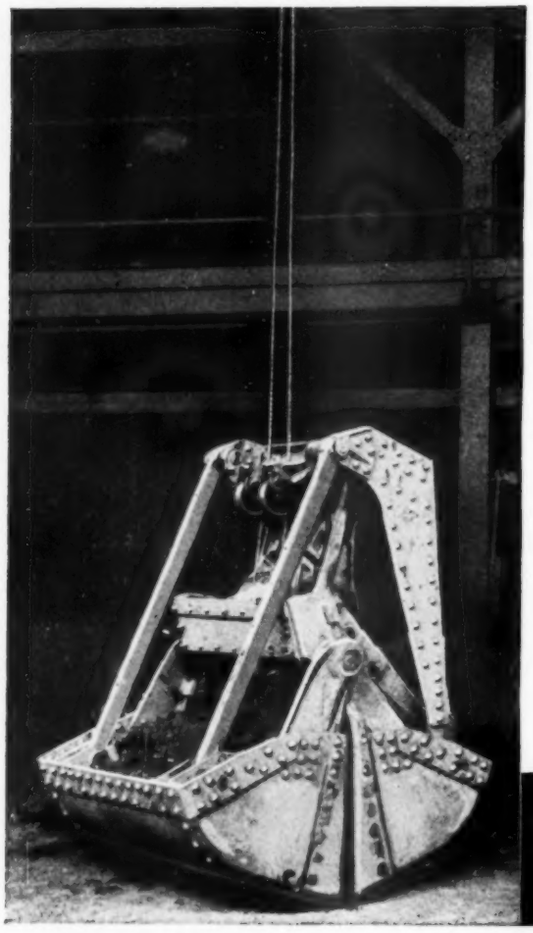
GUARANTEED ACCURATE SIZES

Graded to the new S. A. E. specifications

Performance will prove you are right in selecting "Sure Shot" and "Par Grit" abrasives for blast cleaning. They're unequalled because they're scientifically heat treated by a special process which makes each pellet hard, uniform and tough. They clean faster . . . last longer . . . and do the job better. Our modern screening system guarantees accurate sizes graded to the new S.A.E. specifications. Write today for free samples and price list.

IMMEDIATE DELIVERY **All quantities shipped in double 100-lb. bags, insuring safe delivery. 100-lb. bags, ton and carload lots available.**

The Western Metal Abrasives Co.
Plant: Chicago Heights, Illinois
General Sales Office: 2545 East 79th St.
Cleveland 4, Ohio



Not Adapted to—but DESIGNED for FOUNDRY USE

Any foundryman who investigates the Blaw-Knox line of buckets can tell that a thorough study of foundry requirements has gone into their design . . . There's a wide variety of Single Line, Hook-on types for both low headroom and extremely low headroom installations . . . Check your requirements and operating conditions against Blaw-Knox specifications and you'll come up with the bucket that's exactly right for the job.

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY
2097 FARMERS BANK BUILDING, PITTSBURGH, PA.
NEW YORK CHICAGO PHILADELPHIA BIRMINGHAM WASHINGTON
Representatives in Principal Cities

◀ No. 3125 Single Line "closed head" Hook-on Type bucket. Safety hub trip. Concealed hinge stops. Capacity 1½ cu. yds.

No. 309-F. A ¾ cu. yd. Hook-on Type ▶ bucket designed especially for Foundry use. Requires only 6'-7" operating headroom . . . For complete data on these and other Blaw-Knox Buckets for the Foundry, write for Catalog No. 2002.

BLAW-KNOX BUCKETS

FOR CONSISTENTLY SUPERIOR MOLDS

DEPEND ON GRIMES

● Simplicity of design . . . minimum of working parts . . . every Grimes Molding Machine incorporates these features. Add Grimes positive roll-over and long, accurate draw feature (up to 20") plus other special features . . . result: consistently superior molds. All this means reduced maintenance and operating costs . . . mighty important savings in wartime, or peacetime. Many foundries *depend on Grimes* for all their molding machine needs. Why don't you? Write for complete data.

Hand Rammed Roll-Over Machines
Hand Rammed Power Roll-Over Machines
Jolt Powered Roll-Over Machines
(Illustrated above)

GRIMES MOLDING MACHINE CO.
4161 WRIGHTWOOD AVE., CHICAGO 39, ILL.

IMPROVED DESIGN

PROMPT DELIVERY

"GENERAL" CENTRIFUGAL BLOWERS
Single- and Multi-Stage

FOR GAS AND OIL BURNING
in Non-Ferrous Melting
Core Ovens, Etc.
Annealing Furnaces

AND FOR CUPOLA BLOWING
Special Adaptations as Gas Boosters

FULL RANGE OF SIZES . . .
Pressures - - - 4 to 32 oz.
Horsepowers - - - 1/4 to 50

See New Bulletin CB-104 for Description, Capacity Tables and Dimensions

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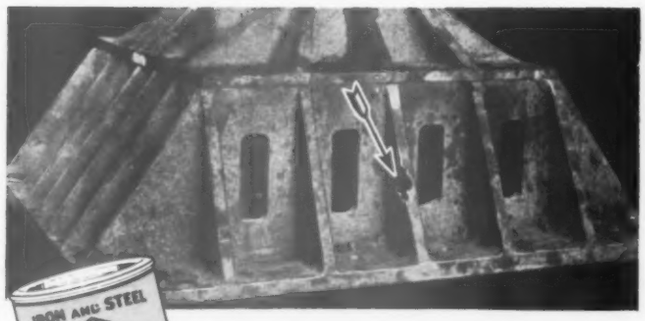
502 N. Dearborn St.

J & C AUTOCLAVE

THE IDEAL METHOD FOR IMPREGNATING MAGNESIUM, ALUMINUM AND OTHER MATERIALS

If you have a problem of densifying magnesium, aluminum, wood or fibrous materials, it will pay you to get the facts about the J & C Autoclave. This ingenious, impregnating system, designed and perfected for one of the country's largest chemical firms is equipped for either steam or electrical heating, and has proven its efficiency. Write for complete information.

JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN



GOOD CASTINGS cost you money, NEEDLESS REJECTIONS waste it

Unsound castings *should* be rejected, but good, sound castings that happen to show up with sand holes, blow holes, pock marks, dented edges or other minor flaws that are only surface deep, should not be allowed to risk rejection.

Smooth-On No. 4 Foundry Cement remedies surface flaws effectively, lastingly and economically. Applied like putty, it hardens like the casting itself, matching it in color and texture, and capable of being filed or machined. A few cents' worth of Smooth-On has often saved an expensive casting from rejection.

CHOICE OF THREE SHADES

Smooth-On No. 4AA, for light gray castings, has fine grain, high lustre, machines perfectly. 1-, 10- and 50-lb. sizes.

Smooth-On No. 4A, for medium gray castings, is close-grained, with good lustre. 1-, 5-, 25- and 100-lb. sizes.

Smooth-On No. 4B, for dark gray castings, is coarser grained, deeper colored. 1-, 5-, 25- and 100-lb. sizes.

TEST AT OUR EXPENSE

If you are not already familiar with Smooth-On No. 4 Foundry Cement, we want you to be, and will send you a generous sample to test on your own castings. Just check the grade you're interested in and mail us the coupon. We'll send also the 40-page Smooth-On Repair Handbook showing many other money-saving uses for Smooth-On Cements.

— –CHECK AND MAIL NOW– —

Free

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570 Communipaw Ave., Jersey City 4, N. J.
Please send Working Sample Smooth-On No. 4AA ☐
No. 4A ☐ No. 4B ☐
Hardened specimens showing color and texture ☐
Smooth-On Repair Handbook ☐
Name .....
Address .....
2-46 .....

Do it with SMOOTH-ON

POWER to SPARE

For Cleaning Snagging and Fine Finishing

Mall REG. U.S. PAT. OFF. FLEXIBLE SHAFT GRINDERS

A SIZE AND MODEL FOR EVERY FINISHING JOB

The extra power, constant high speed and stamina in a Mall Flexible Shaft Grinder lengthen tool life, reduce rejects and keep your Grinding, Disc Sanding, Wire Brushing, Polishing and Buffing jobs moving efficiently. Lightweight attachments for each of these operations are quickly and easily interchanged.

The flexible shafting combines with the swivel-mounted motor to keep weight from operator's hands and make power available in any position. Thus, it lessens fatigue and materials handling.

Ask your Supplier or Write for catalog on Mall Flexible Shaft Grinders, Mall Flexible Shafting, MallDrills, and MallSaws.

MALL TOOL COMPANY
7720 SOUTH CHICAGO AVENUE
CHICAGO 19, ILLINOIS
*25 Years of "Better Tools For Better Work"

Mall PORTABLE POWER TOOLS

for F-A-S-T PRODUCTION

WYCO

HEAVY DUTY HOLE CUTTER

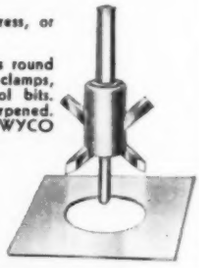
Quickly adjustable from 4½" to 10" Diameters.

Fits 1" Drill Chuck, or can be ordered with Morse Taper Shank.

Heavy duty tool. Cuts absolutely clean round holes or washers from steel plate or other material up to 1/2" thickness. Cuts as accurately to size as a boring tool. Tool holders and body heavy steel—very rigid. Has 2 standard high speed cutting off blades for balanced cut. 1/2" hardened pilot pin. Shanks interchangeable. Complete with 7/8" hexagon shank, fitting any 1" drill chuck, or with No. 3 or No. 4 Morse Taper Shanks.

WYCO HOLECUTTER for electric drill, drill press, or carpenter's brace.

Fits any 1/2" drill chuck. Self tightening. Cuts round holes in sheet metal, bakelite, fibre, etc. No clamps, wedges nor screws. Uses standard drills and tool bits. Cutter bits standard high speed lathe bits. Easily sharpened. Can be used with pilot drill. Send for Complete WYCO Catalog.



WYZENBEEK AND STAFF, Inc.
852 W. Hubbard St. Chicago 22, Ill.
Makers of Profit-Producing Tools

ONE WAY TO CUT PRODUCTION ON DEFECTIVE CASTINGS

USING sand slightly out of condition tends to produce defectives—on which you lose both cost and profit.

N & F super-concrete stave sand storage bins will permit you to buy sand already conditioned, store it that way, and hold it "ready to go."

Many foundries obtained top priorities and installed N & F bins during the war—government rating them essential equipment. Probably you should also install bins for sand storage.

THE NEFF & FRY COMPANY
CAMDEN, OHIO

Catalog Ready

SAND STORAGE BINS

The Revolutionary Riser Flux....

CASTFLUX
TRADE MARK REG.

Comparison Invited

The surest way to determine the superiority of CASTFLUX is to make comparisons by actual tests.

If CASTFLUX shows up better than the flux you are now using, and costs you no more, then it is definitely to your advantage to use CASTFLUX.

CASTFLUX is being consistently used in hundreds of foundries where tests and comparisons were first made. We welcome similar tests in your foundry, because we are sure of the results obtained by CASTFLUX.

Send us an order for 500 pounds. Use CASTFLUX as directed, and if it doesn't conform to our representations, material can be returned at no expense whatever to yourself.

NATIONAL PIGMENT COMPANY

2115-2117 E. York Street • Philadelphia 25, Pa.

THERE IS NO QUALITY

CEILING ON

TERRE HAUTE

SPECIAL FOUNDRY

COKE

Sold Exclusively by

REPUBLIC COAL & COKE CO.

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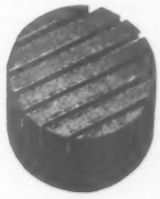
BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati

Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

SMILLIE

SLOTTED TYPE ONLY

CORE  BOX

VENT

"A Specific Type for Every Core Box"

- Made of brass and diameter held to close tolerance.
- May be machined to any contour without removal from the core box or plate.
- "Shallow" or "deep" head.
- "Narrow" or "wide" slots.
- Easily inserted.
- Easy to clean.
- Greater vent area.
- Rapid Escape of air.

Write for full information on Smillie Cleaning Tool and Smillie Inserting Drill.

C. M. SMILLIE & CO.

1900 WOODWARD BLVD. BERKELEY 20, MICH.

TOOLS • PRECISION SCREW MACHINE PRODUCTS • SPECIALTIES IN SMALL STAMPINGS

PRECISION X—MEANS THE EXTRA VALUE IN SMILLIE PRECISION

THE TOUGHER THE JOB THE MORE REASON TO "BUY AMERICAN"

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MANHATTAN ABRASIVE WHEELS

Custom-Engineered for Service

Rubber and resinoid bonded—for sustained high-speed operation—MANHATTAN Abrasive Wheels wear evenly, grind accurately.

Designed and engineered with proper specifications for your job. Wheels also for snagging, cutting-off; and resilient wheels for polishing.

For special grinding problems, consult

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"Vibra-Flow"

VIBRATORY FEEDERS

With rheostat control of rate of feed.

Provide the easy, economical method of adding graphidox or ferrosilicon to foundry iron—direct to the ladle stream.

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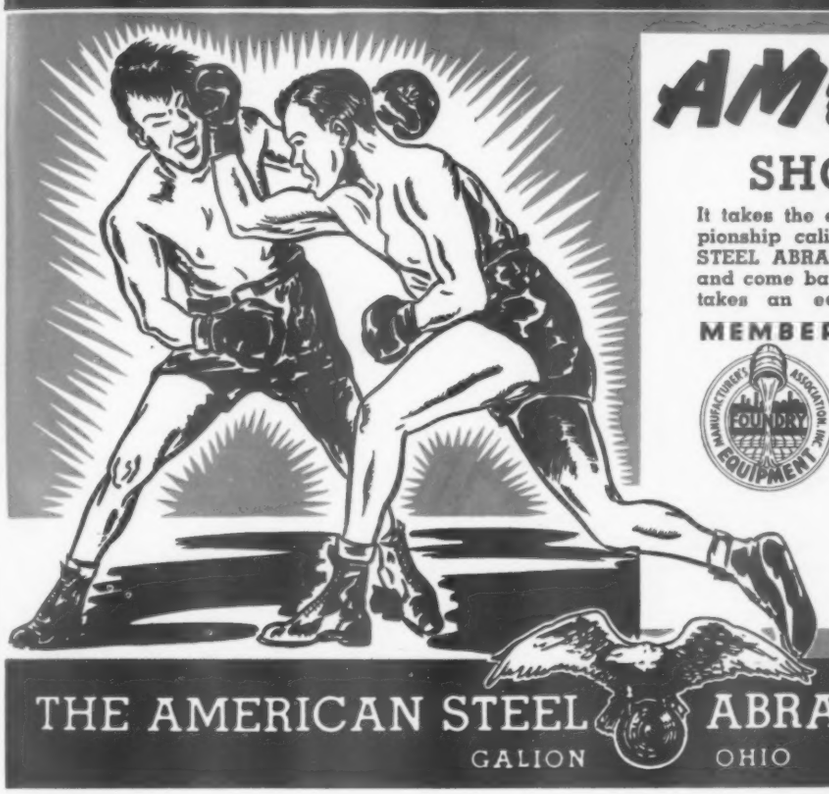

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SHOT AND GRIT

It takes the extra punch and greater stamina of championship caliber to get in there and win. AMERICAN STEEL ABRASIVES have proven that they can take it and come back for more. Hard and uniform, each pellet takes an equal share of the beating. AMERICAN STANDARDIZED STEEL SHOT and EVERSHARP STEEL GRIT are produced by a special method of manufacture and heat treating to give them longer life and greater durability. They will assist you in producing more, with greater economy. Use AMERICAN STEEL ABRASIVES in all your air and airless cleaning equipment for the best in service!

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Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

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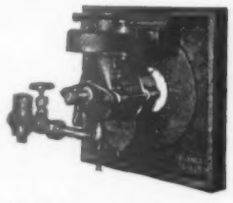
JOHNSTON

BURNERS
OIL and GAS
"REVERSE BLAST"



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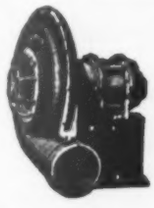

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A Cleanblast Engineer is always available to help solve your blast problems.

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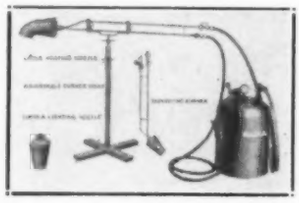

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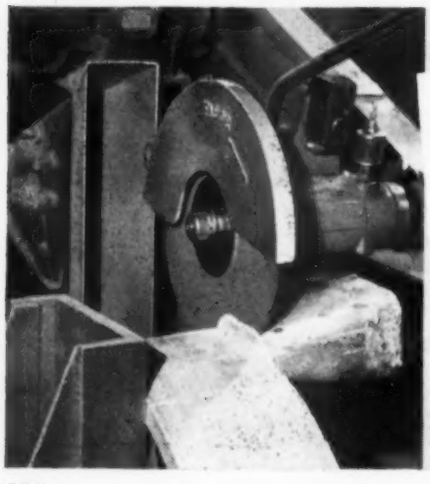

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VERTICAL, HORIZONTAL

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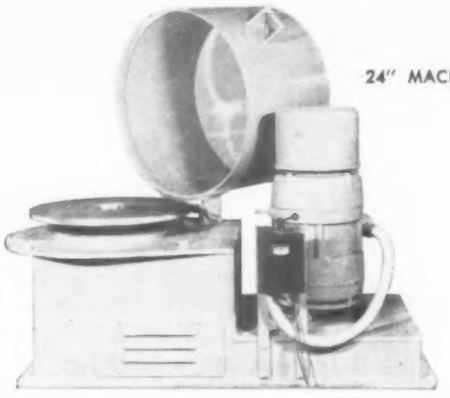
For better castings, increase furnace yield, less scrap, reduced machining cost.

We have engineers available to make complete studies to determine investment, production cost, and make recommendations.



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This Patented Chaplet

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and similar castings

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Chaplets

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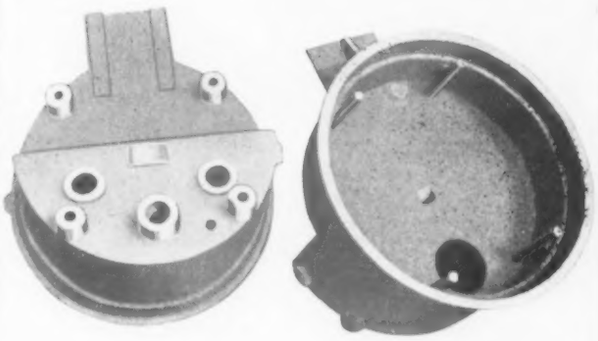

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These aluminum castings for washing machinery were protected by Waterlox Transparent on the vulnerable surfaces of the chambers subject to washing solutions, hot water, and alkalies.

Waterlox seals all types of metal castings against the wear of hot oil, sludge, and grit. Write for specifications.

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for **YOUR** *foundry*

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THEY MAKE MONEY FOR YOU . . .

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Moline Squeezers were developed by engineers who knew the importance of retaining rigidity and accuracy under the toughest production schedules. They are made of highest quality steel, malleable iron and semi-steel casting . . . handle flasks up to 16" x 30" . . . eliminate the high cost of compressed air . . . and require a minimum amount of floor space. Every one is ruggedly built to give years of trouble-free, dependable service.

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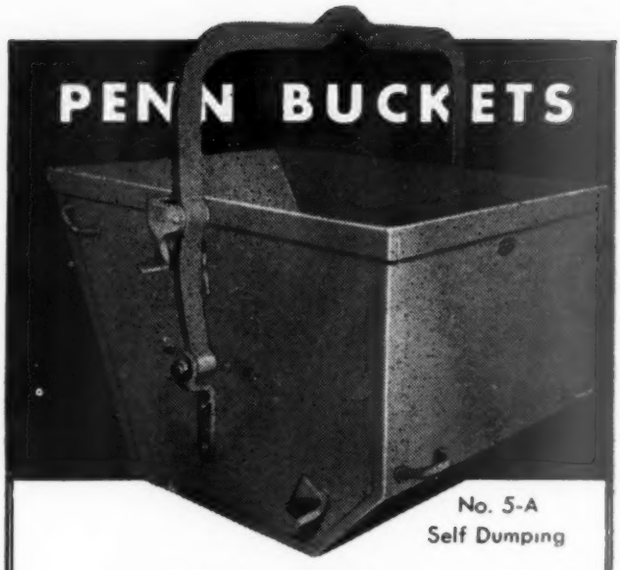

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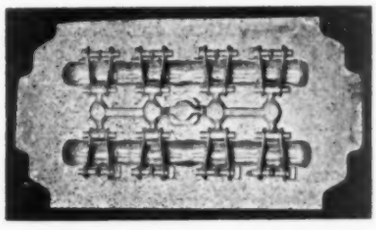

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MODEL M

This machine accommodates both metal molds and flasks for sand molding.

Continuously variable speed control using standard AC power.

Built in six sizes for castings from 1½" O.D. to 16" O.D. and up to 48" long.

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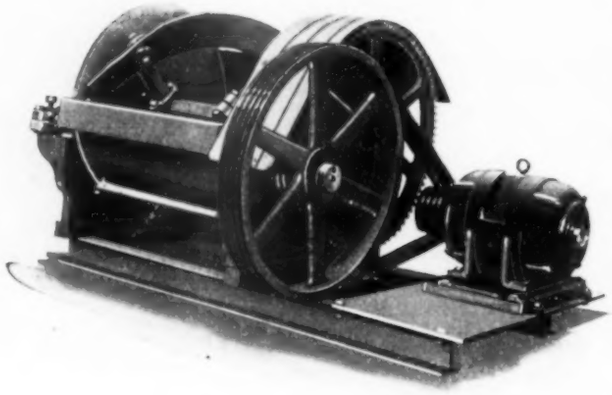

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Multiple Core Boxes.

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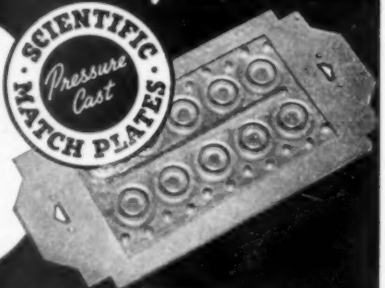

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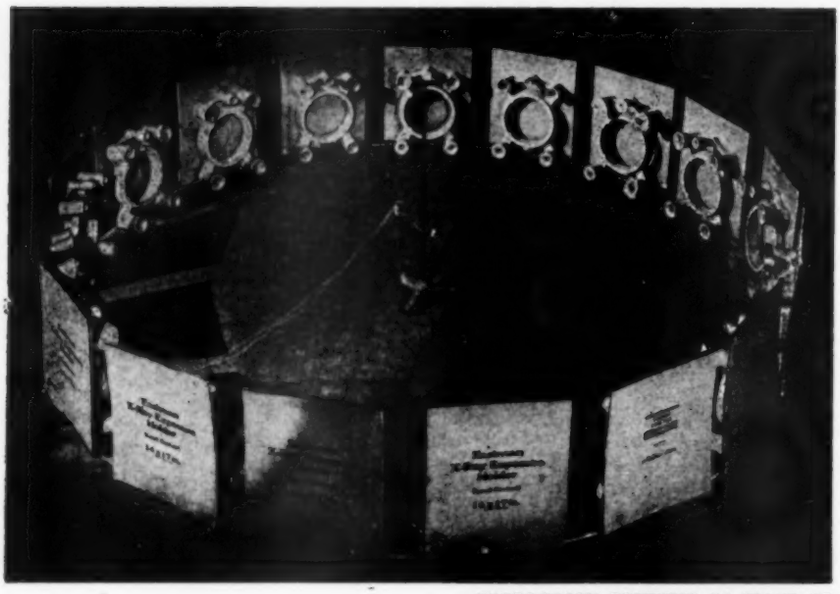

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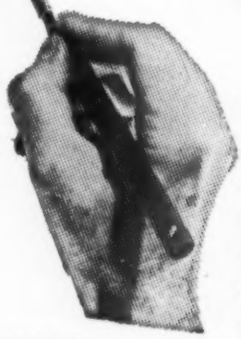

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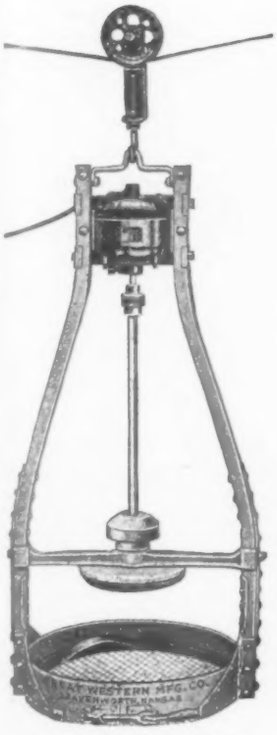

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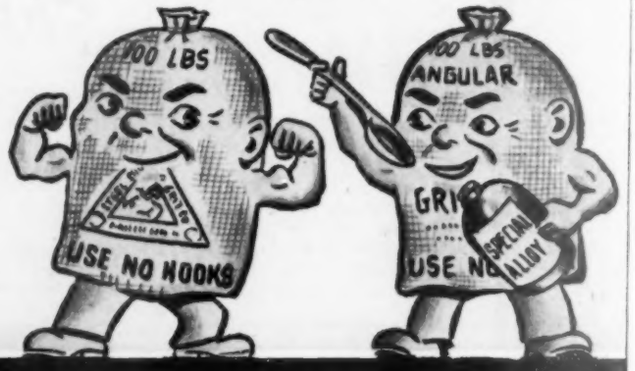

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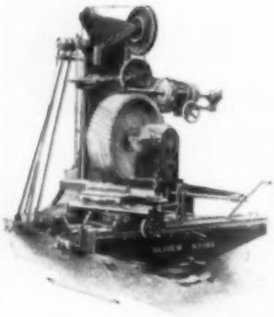

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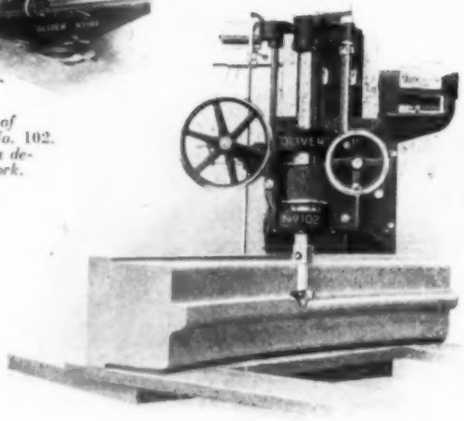
Two views of the Oliver No. 102. At right is a detail of the work.



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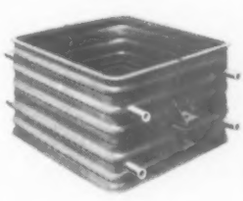

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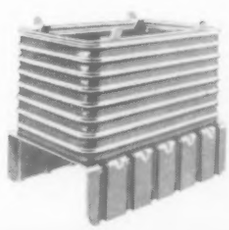

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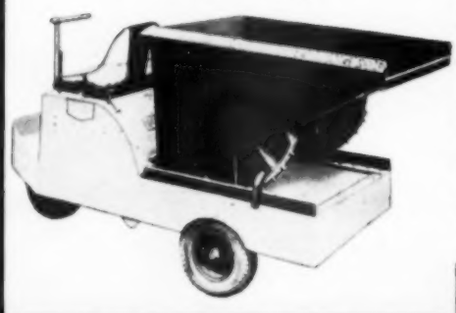

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Lanly Company, 750 Prospect Ave., Cleveland 15, O.
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Young Bros. Co., 6508 Mack Ave., Detroit 7, Mich.

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Neff & Fry Co., Camden, O.

SAWS (Band, Metal, Wood)

Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Cold Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SAWS (Masonry)

Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.

SCALING HAMMERS

Dayton Pneumatic Tool Co., Dayton 1, O.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Schramm, Inc., West Chester, Pa.

SCHOOLS (Correspondence)

McLain's System, Inc., 236 E. Worth St., Milwaukee 12, Wis.
4600 E. 71st St., Cleveland 5, O.

SCREENS (Shake-Out)

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.

SCREENS (Shake-Out) (Cont'd.)

C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., Passaic, N. J.
Screen Equipment Co., Buffalo, N. Y.

SEA COAL

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Midwest Foundry Supply Co., Edwardsville, Ill.

SEPARATORS (Abrasive)

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Johnson Corporation, Three Rivers, Mich.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Magnetic)

Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Dings Magnetic Mfg. Co., E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Jackson & Church Co., Saginaw, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Robins Conveyors, Inc., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOES (Safety)

Hy-Test Shoe Co., Div. International Shoe Co., St. Louis, Mo.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio
Globe Steel Abrasive Co., Mansfield, O.
Hickman-Williams & Co., Cleveland 14, O.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.
Western Metal Abrasive Co., 2545 East 79th St., Cleveland 4, Ohio

SHOT (Peening)

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, Ohio.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio

SHOT (Peening) (Cont'd.)

Globe Steel Abrasive Co., Mansfield, Ohio.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Penna.
Steel Shot & Grit Co. Inc., 39 Warren Ave., Boston, Mass.
Western Metal Abrasive Co., 2545 E. 79th St., Cleveland 4, O.

SHOVELS

Federal Foundry Supply Co.,
Frederic B. Stevens, Inc., Detroit 26, Mich.
Wood Shovel & Tool Co., Piqua, O.

SHOVELS (Power)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

SILICA FLOUR

Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

SILICON (Briquets)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N.Y

SILICON CARBIDE (Briquets)

Carborundum Co., Perth Amboy, N. J.

SILVERY PIG IRON see Pig Iron (Silvery)

SKIMMER BARS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

SKIP HOISTS

Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill

SLIP FLASKS

Adams Co., 700 Foster St., Dubuque, Iowa.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SLIP JACKETS

Adams Co., 700 Foster St., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SMELTERS & REFINERS

American Smelting & Refining Co., 120 Broadway, New York 5.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., 700 Foster St., Dubuque, Iowa.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SODA ASH

Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N.Y.

SOLDER

American Smelting & Refining Co., 120 Broadway, New York 5.

SPECIAL FOUNDRY ALLOYS

Vanadium Corp. of America, 420 Lexington Ave., New York, N Y

SPIEGELEISEN

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SPRAY GUNS

Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn

SPRUE CUTTERS

Adams Co., 700 Foster St., Dubuque, Iowa.
Freeman Supply Co., Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

STEEL (High Speed)

Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Structural)

American Bridge Co., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

STORAGE BATTERIES (Industrial)

Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

STRIPPING MACHINES

Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS

N. Ransohoff, Inc., 208 W. 71st St., Cincinnati 16, O.

TAPER PINS

Standard Horse Nail Corp., New Brighton, Pa.

TEMPERATURE CONTROLLERS

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

TESTING LABORATORIES

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago 5, Ill.

THERMOCOUPLES

Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

TIERING MACHINES (Power)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TIMERS (Electric)

Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TONGS

Industrial Equipment Co., Minster, O.

TOOLS (Pneumatic Portable)

Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)

Freeman Supply Co., Toledo 5, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

TOTE BOXES

Cleveland Wire Spring Co., 1281 East 38th St., Cleveland 14, Ohio.

TRACTORS (Gas Powered)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAMRAIL SYSTEMS

American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

TRAPS (Steam)

Johnson Corporation, Three Rivers, Mich.

TROLLEYS

Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

TRUCK BATTERIES (Industrial)

Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

TRUCK CRANES

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, O.

TRUCKS (Electric-Industrial)

Elwell-Parker Electric Co., Cleveland, O.

TRUCKS (Power Lift)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.

TRUCK WHEELS

Bethlehem Steel Co., Bethlehem, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TUMBLING BARRELS

Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES

Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Foundry Equipment, Inc., 100 Grand St., Coldwater, Mich.
Modern Equipment Co. Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

VACUUM CLEANERS

Allen Billmyre Co., Mamaroneck, N. Y.

VALVES (Air, Water, Steam)

Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.

VALVES (Air, Water, Steam) (Cont'd.)

Cleveland Vibrator Co., 2110 Superior Ave., W., Cleveland, O.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

VALVES (Adjustable Orifice)

North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

VALVES (Blow-off and Cut-off)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Co., Cleveland 4, O.
Peters-Dalton Inc., 17900 Ryan Rd., Detroit 12, Mich.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

VENTS (Core Box)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
Reinacker Industries, 2035 Hilton Rd., Ferndale, Mich.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS

Adams Co., 700 Foster St., Dubuque, Iowa.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, O.
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nicholls Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., 2217 W. Michigan St., Milwaukee, Wis.

WAX (Core, Vent, Pattern)

Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING (Acetylene Generators)

Sight Feed Generator Co., Richmond, Ind.

WELDING APPARATUS (Electric Arc)

Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Sight Feed Generator Co., Richmond, Ind.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

WHEELBARROWS

Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS (Cut-off)

West Co., Inc., 1117 Shackamaxon St., Philadelphia 25, Pa.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE NAILS

Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

WOODWORKING MACHINERY

Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT

Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
X-Ray Incorporated, Book Tower, Detroit, Mich.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.
X-Ray Incorporated, Book Tower, Detroit, Mich.

X-RAY INSPECTION

Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.
X-Ray Incorporated, Book Tower, Detroit, Mich.

ZINC

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

Classified Advertising

Help Wanted

SALES REPRESENTATIVE WANTED

A reputable firm entering the national field with a superior grade nonferrous alloy desires representation in the following territories.

BOSTON, MASS.
RICHMOND, VA.
DALLAS, TEXAS
OKLAHOMA CITY, OKLA.
ST. LOUIS, MO.
BUFFALO, N. Y.
PROVIDENCE, R. I.
SALT LAKE CITY, UTAH
PORTLAND, ORE.
SAN FRANCISCO, CALIF.

If interested, state present coverage and references. Established sales representatives preferred.

BOX 331

THE FOUNDRY CLEVELAND 13, OHIO

SALES MANAGER FOR STEEL CASTINGS

We are looking for a man who knows the steel foundry business intimately and has the experience, ambition and drive to be a successful manager of sales. The man we want may be a sales manager now in a similar line; he may be associated with steel foundry operations in another capacity but has the knowledge, confidence and know how that makes sales and inspires others. The advertiser is a large and well known producer of steel castings for steel plants, railroads and other industrials with a reputation for quality production, good service and costs that are competitive. This is a position with a future and with satisfactory compensation. Employees of the advertiser are informed of the publication of this advertisement. Replies are confidential. Address: Box 461, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURERS AGENT

WANTED by firm with excellent reputation to handle its well-known nationally advertised line of thoroughly proven foundry products including not only core, mold and pattern coatings but also outstanding product for permanent mold, die and centrifugal casting and coating for pots, ladles, goosenecks, etc. Competent engineering sales ability required and must be thoroughly acquainted with foundry practice and trade in this area. Must be high type with unquestioned background of integrity. Liberal straight commission basis with strong advertising and other backing. Will consider individual or small firm handling one or two other **non-competitive** lines. Open to consider representation in Detroit, Pittsburgh, Cleveland, Cincinnati, Philadelphia, Minneapolis, Denver areas. All inquiries will be held strictly confidential. Send full particulars to Box 482, The FOUNDRY, Cleveland 13, Ohio.

CUPOLA OPERATOR

Experienced cupola operator wanted by small gray iron foundry located in Southern Michigan. Must be capable assuming full responsibility, all cupola operations, organizing own work and supervise cupola department. Ladle lining, charging of stack, handling men and taking chill tests. Age 28 to 50. Only those interested in permanent position need apply. Address: Box 496, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURER'S AGENT

National manufacturer has established territories for foundry salesmen. Orders repeat continually. No objection to non-conflicting lines. Excellent earnings. Reply fully in confidence. Address: Box 483, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY FOREMAN

A working foreman to assist Foundry Superintendent in a well equipped production brass foundry; good opportunity for a hustler. State age, experience and salary desired in first letter. Address: Box 192, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

PATTERN MAKER WANTED

An experienced pattern maker capable of supervising a small but well equipped pattern shop for a well established company which operates its own foundry. In reply give full details and information stating age, education and general experience in pattern making. Location Columbus, Ohio.

BOX 500

The FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Gray iron jobbing-production foundry located North Central states, employing 50 people has opening for progressive foundry superintendent or engineer capable of handling entire foundry. Practical foundry experience essential; must be fully qualified to supervise all departments, handle personnel, train apprentices; increase departmental efficiency for reduced costs and increased production. Progressive attitude and familiarity with modern methods leading toward mechanization. Age—35 to 50. College education or equivalent; engineering background helpful. Opportunity for financial interest in business after proving ability and worth. Address: Box 497, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN WANTED

By Mid-west semi-steel and gray iron jobbing producing medium weight castings. Assured of numerous peace time contracts. Foundry expansion now underway. Must have A-1 foundryman skilled in modern foundry methods and cupola operation. In reply state age, outline of experience and salary expected.

BOX 463

The FOUNDRY CLEVELAND 13, OHIO

REPRESENTATIVES

Leading manufacturer of core oils and other products requires two first class representatives to cover middle west territory. Preference given those having an established following in core oil and who are able to demonstrate and sell it. Reply fully in strict confidence stating age, experience, salary and or commission desired. Address: Box 481, The FOUNDRY, Cleveland 13, Ohio.

SAND REPRESENTATIVE

Old established company has permanent position for Salesman to cover Mid-west territory. Must know sand control and analysis and understand general foundry practice. Excellent opportunity for man with successful sales experience. State qualifications, references and starting salary desired. Address: Box 449, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT FOUNDRY FOREMAN

Real opportunity for aggressive young man to supervise directly, molding and pouring of light gray iron castings. Company has operated successfully for a great many years and a steady position, with future assured for the right applicant, is open for immediate acceptance. State experience and salary expected. Address: Box 419, The FOUNDRY, Cleveland 13, Ohio.

WANTED

SALESMEN or MANUFACTURERS' AGENTS
Now calling on foundries and forgings companies to handle complete line of Missouri refractories. Write in detail giving territories now covered, products handled, qualifications, etc. Address: Sales Manager, Chicago Fire Brick Company, 1467 Elston Ave., Chicago 22, Ill.

METALLURGIST

For complete charge of aluminum department in plant in Chicago area making secondary aluminum ingot. Address: Box 477, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

SALES REPRESENTATIVE WANTED

A prominent firm engaged in the manufacture of melting furnaces, both cast iron and nonferrous, desires to make contact with high grade live wire organizations or individuals now covering the following territories and contacting the foundry industry.

Cleveland
Boston
Cincinnati
Kansas City
San Francisco
Denver

Interested parties should write stating territories covered, how long, and lines now being handled.

BOX 490

THE FOUNDRY CLEVELAND 13, OHIO

FOREMAN

Wanted for small gray iron production foundry. Must be able to take charge of 22 squeezer molders, all green horns. We make motor ends and plenty of other tough jobs so must have a man who knows what it is all about. The man we want should not be over 40 and not afraid to work, as there will be plenty of it attached to this job. You don't need a college degree to qualify for this job, all you need is plenty of practical experience, be able to think for yourself and know how to handle men. Give age, past employers, salary expected and all pertinent facts in first letter. Send recent photograph if possible to: **PROGRESSIVE FOUNDRY CO., PERRY, IOWA.**

MALE HELP WANTED

General Superintendent
Assistant Foreman
Core Room Foreman
Cupola Tender

For newly formed production gray iron foundry in Western Pennsylvania.

BOX 459

The FOUNDRY CLEVELAND 13, OHIO

OFFICE MANAGER

Man under 50, capable of setting up books and operating office and sales force for Middle West steel foundry. Address: Box 355, The FOUNDRY, Cleveland 13, Ohio.

YOUNG ENGINEER

Preferably with foundry supervisory or metallurgical experience for a small foundry operated by an established metal producing company. Submit resume and photograph in applying for interview. Address: Box 474, The FOUNDRY, Cleveland 13, Ohio.

FACTORY ENGINEER

Sixty-three year old Ohio manufacturing concern seeks services of Engineer with gray iron foundry experience, to study methods, all controls with object of assuming substantial management responsibility as soon as qualified. Energy, common sense and ability to get along with others are essential. Excellent opportunity. State age, education, experience and salary desired. Include recent snap shot or photograph, which will be returned. Address: Box 412, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

Middle West acid electric steel foundry needs man under 40, with college metallurgical training and enough all around experience to supervise all phases of steel casting manufacture. Address: Box 354, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Help Wanted

PATTERN DEPARTMENT FOREMAN

To operate department constructing and maintaining wood and metal pattern equipment used in our production foundry, making enamel cast iron plumbing fixtures. Plant located in Northeastern Ohio. Address: Box 464, The FOUNDRY, Cleveland 13, Ohio.

FACTORY MANAGER

Wanted for a medium-sized concern, manufacturing strip-steel and wire-grip products. Want experienced man, thoroughly capable of taking complete charge of plant operation; having full knowledge of production, tooling and streamlining plant operation. Give full details: personal history, qualifications, past experience, salary requirements. References held confidential, if requested. Address: Box 460, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM OPEN HEARTH OPERATOR

Secondary nonferrous refiners. Midwestern Region. State experience, qualifications, references and wages desired in first letter. Address: Box 307, The FOUNDRY, Cleveland 13, Ohio.

EXPERIENCED FOUNDRY SUPERINTENDENT

Gray Iron Foundry in Midwest manufacturing light-medium-heavy castings on production and jobbing basis to take complete charge of foundry department. Wonderful opportunity for the right man. State age and qualifications. Address: BOX 484, The FOUNDRY, CLEVELAND 13, OHIO.

CORE ROOM FOREMAN

Well known manufacturing company in Georgian Bay District, Ontario, requires foreman experienced in all phases of core room work on small and large cores. Permanent for right man. Address: Box 469, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Man with pattern making and foundry experience to run pressure match plate business. Must be able to train new employees and take over complete operation of plant. State training, experience and references. Address: Box 473, The FOUNDRY, Cleveland 13, Ohio.

BRASS OPEN HEARTH OPERATOR

Secondary nonferrous refiners. Midwestern Region. State experience, qualifications, references and wages desired in first letter. Address: Box 306, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPPLY JOBBERS—ATTENTION

Established manufacturer of air tool products with complete foundry line of air tools requires wider distribution for their products. If you are at present selling to foundries, please communicate with us. Address: Box 405, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Small gray iron production foundry located 40 miles from Des Moines, Iowa, wants working foreman for core room employing about 14 coremakers on small motor end cores and miscellaneous small cores. Must be familiar with sand mixes and be able to take complete charge. Give age, past employers, salary expected and all pertinent facts in first letter. Send recent photograph if possible to: PROGRESSIVE FOUNDRY CO., PERRY, IOWA.

CORE ROOM FOREMAN

Experienced core room foreman wanted by small jobbing - production, gray iron foundry. Location—North Central states. Man thoroughly versed in modern core practice—rigging for production machines and jobbing cores, both light and heavy. Handle apprentce training program, record work, and layout of general core room for greatest efficiency. State age, education, family status, record of employment and references. Address: Box 498, The FOUNDRY, Cleveland 13, Ohio.

CUPOLA TENDER

Mansfield, Ohio gray iron foundry desires services of thoroughly experienced cupola tender. State age, experience, give references. Address: Box 493, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

CORE ROOM FOREMAN

Core room foreman with experience in Malleable and Gray Iron. Want man who has had production experience with core blowing machines. Located within 100 miles of Chicago. Address: Box 462, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Grey Iron Foundry producing Heavy Machinery and Diesel Engine Castings has exceptional opportunity for thoroughly experienced foundryman. Must be able to estimate heavy jobbing work accurately from blueprints. State age, qualifications, references and expected salary. Address: Box 410, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

STEEL FOUNDRY FOREMAN

Desires good connection with future possibilities. Have 25 years' practical experience as steel molder and steel foundry foreman on heavy, medium and light, high pressure carbon and alloy steel castings for steam turbine, oil field and general jobbing work. Technical education, McLain and I.C.S. graduate, chemistry, metallography and heat treatment. Expert gating and risering. Know Williams riser and use directional solidification. Can produce homogeneous fine appearing casting with high yield and minimum grinding and chipping. Excellent rigger for machine production. Good on synthetic sand control. Vast experience on external and internal chilling. Can figure costs. Know layout and procurement of foundry equipment. Address: Box 501, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Foundry metallurgist with seventeen years' experience as metallurgist and foreman in large automotive gray iron and malleable foundries desires position in medium sized gray iron foundry in northern Ohio or Michigan. Wide experience in all branches of foundry work. Technical training. Best of references. Address: Box 491, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales, finance and production. Excellent experience machinery, tool, foundry and related lines. Address: Box 445, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER OR SUPERINTENDENT

McLain Graduate of Milwaukee. Practical foundryman with many years' experience in Gray Iron Cupola or Electric Furnace and nonferrous metals—light, medium and heavy castings. Understand foundry from molding, core room, grinding room to shipping room. A-1 foundryman. Age 44 with best references. Employed as foundry superintendent. Address: Box 339, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Now employed wishes to make a change. Has had years of experience. Unusual background of experience both in the foundry and the completion of the product. Have excellent reputation for developing new methods. Forty-one years of age, married and family. Address: Box 330, The FOUNDRY, Cleveland 13, Ohio.

WORKS MANAGER—SUPERINTENDENT METALLURGIST

Will buy interest in small iron or steel foundry, or accept position as above. Thirty years in iron and steel foundries. Have supervised the construction of one large steel foundry and the modernization of two others during the war. Unquestionably know melting, acid and basic electric and converter operation, production molding, sand control and general efficient supervision of all departments of the foundry. Can modernize your foundry and operate it efficiently. Age 49, college graduate. Address: Box 503, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Desire position as foreman of grey iron foundry. Twenty-three years' experience on ingot moulds and all kinds of machine castings. Address: Box 502, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT

Practical gray iron foundryman, technically trained with 28 years' broad experience producing quality castings, from molder to superintendent of foundry pouring 300 tons daily. Background in general jobbing, machine tool, Diesel motors and automotive high production castings. Well versed in both conventional and highly mechanized foundries using continuous pouring sand control, cupola, core blowers, rigging for molding machines and working from blue prints. Would like to make a change with good reliable aggressive firm needing the services of a high grade foundryman for results. Age 47. Address: Box 479, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Thirty years of age, 12 years' experience as a molder in iron and aluminum and small experience in nonferrous metal desires position as foreman or superintendent. Experienced in heavy machine tools up to 15 tons. Also valve, locomotive, aeronautical and general jobbing castings. Experienced in green sand and dry sand molding, core making and melting. A McLain graduate. Also a veteran of World War II. Will go anywhere with an assured future. Address: Box 470, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Gray iron foundry executive. Sound background and experience in all foundry procedure. Ability to achieve quality production. Practical and technical with all phases of foundry operations. Molding, coremaking, cupola operation, melting, metallurgy, costs, sales and contracts. Experienced trouble shooter between foundry laboratory, machine and pattern shop. Good rigger for production. In present connection years of experience as foundry superintendent with the responsibilities of a foundry manager. Address: Box 312, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT-MANAGER

Practical gray iron foundryman, graduate metallurgist, with very broad background of foundry experience in light, medium and heavy castings, both green and dry sand. Well versed in molding, cores, cupola, cleaning, rigging in jobbing, machinery and high pressure castings. Wants to relocate in either New England or East with reliable foundry needing good practical foundryman. Right connection main thing. Age 46. Address: Box 480, The FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD ENGINEER OR FOUNDRY SUPERINTENDENT

Practical and technical nonferrous foundryman. Practical designer, estimator, foundry manager, metallurgist, molder, coremaker and inspector. Many years' experience training labor in foundry practice. Available immediately. Address: Box 466, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR ASSISTANT

Twenty-one years' practical foundry experience. Eleven years' molding, ten as supervisor, foreman, superintendent of gray iron, semisteel and alloy shops. Experienced in rigging and gating for fast production and quality. Also mixtures of facing and cupola practice. Age 43, high school education, member AFA, good references. Address: Box 485, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Fifteen years' experience as chemist, metallurgist and foundry superintendent, stainless steel and electric furnace gray iron, light and medium weight pressure castings. Know melting, sand control, molding, coremaking, gates, risers and heat treating. Available January 1, 1946. Address: Box 446, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN OR SUPERINTENDENT

Thirty-three years' experience in all branches iron and nonferrous. Twelve years South America, one year in the Orient on Government Assignment. Best of references that will stand investigation. Prefer Latin America but will go anywhere. Address: Box 487, The FOUNDRY, Cleveland 13, Ohio.

PRODUCTION MANAGER

Available for position in plant employing 200. Twelve years in production work. Age 42, college graduate, married, reliable, conscientious, record of proven ability. Emphasis on planning and scheduling. Write: ALAN F. BISHOP, 451 Pine St., Lockport, N. Y.

Classified Advertising

Positions Wanted

HOW TO SELL THE CHICAGO AND MIDDLE WESTERN MARKET

Live wire sales representative with 15 years' successful background, available to a manufacturer of Malleable and Cast Iron Pipe Fittings, Steel Pipe Nipples, Cast Iron Soil Pipe or Copper Tubing and Brass Pipe. I have orders on hand, also a very broad acquaintance with key buyers of, and major users of, these products in this territory, and by my sound sales plan will assure maximum results. If your company has these meritorious products and is deserving of optimum sales distribution, it will pay you to consider strongly my comprehensive sales-representation for your coverage of this territory. Can give you a minimum guarantee of set dollar volume or you need not pay me one penny commission if I fail to meet quota during 90 day trial period. Write or wire.

BOX 407
THE FOUNDRY CLEVELAND 13, OHIO

PRACTICAL-SUPERINTENDENT

Practical gray iron foundryman age 47, tech nically trained with broad experience in modern foundry practice in both jobbing and high production. Well versed in sand and cupola control, rigging machines, cores, cleaning and foundry costs. Background of over twenty-five years practical experience as molder, foreman and superintendent in tonnages up to 250 tons daily in light medium and heavy castings. Wants to make connection with foundry needing services of real foundryman who would consider share of business in return for services. State full details in first letter. Address: Box 478, The FOUNDRY, Cleveland 13, Ohio.

SUPERVISOR

Eighteen years' foundry experience including Pattern Shop Foreman, Foundry Contact Man and Foundry Engineering desires position as Sales Representative in Northwestern Pennsylvania area. Age 40 years, married. Address: Box 377, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM FOUNDRY ENGINEER AND EXECUTIVE

Graduate metallurgist with thirteen years' experience in aluminum, sand and permanent mold foundry work. Record includes technical, metallurgical, supervisory and managerial experience. Would like position with progressive company. Address: Box 457, The FOUNDRY, Cleveland 13, Ohio.

SALES FIELD

Man with 20 years' foundry experience. Molding, cupola practice, sand control, four years foundry superintendent. Desires change. Would like to enter sales field of foundry equipment and supplies. Member AFA, single, can furnish best of references. Address: Box 486, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Fully experienced in nonferrous metals—light, medium and heavy castings. Cores and coreroom work. Twenty years' experience. Age 44. Neat and aggressive. Employed. Address: Box 465, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Iron-steel noferrous. Up to date. Practical and technical. Handle fully any size. American, age 60. Now located in the Northwest. Address: Box 624, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER

Experienced in the production of both malleable and grey iron light castings. Will be available February 1st. Address: Box 467, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Gray iron, malleable or steel. McLain graduate. Jobbing or production. Estimate from blue prints. Light and medium castings. Available immediately. Address: Box 488, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY PRODUCTION SUPERVISOR

Supervisor of foundry production for 25 years. Special experience in planning and production control. Address: Box 863, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Graduating from M.I.T. in February, desires employment in concern producing brass or bronze castings. Age 23, single, veteran. Address: Box 395, M. I. T. Dormitories, Cambridge 39, Mass.

Positions Wanted

BRASS FOUNDRY FOREMAN

Practical experience on high grade work including chandelier castings, grave markers, ornamental bronze, hardware, steam valves, jobbing and production work. Prefer position with manufacturing plant. Address: Box 472, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERVISION

By man with 16 years' practical foundry experience; 8 years' supervisor in core making, molding, sand control, scrap and yield. Capable of rigging. Thorough knowledge of stoker screw manufacturing. Age 36; married. Address: Box 406, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

Desires position as superintendent or foreman of gray iron foundry. Thirty years' experience as molder and foreman. Capable of taking complete charge of production or jobbing shop. Address: Box 495, The FOUNDRY, Cleveland 13, Ohio.

PRESSURE CAST MAN

Capable of organizing and running a shop to produce pressure cast matchplates. Cope and drag equipment and precision castings. Address: Box 418, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRY FOREMAN

Desires position with progressive jobbing foundry. Twenty years' practical experience as molder and coremaker, eight as foreman. Good rigger and can handle help. Experience includes monel, nickel, manganese bronze, copper, etc. Address: Box 489, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EQUIPMENT ENGINEER

Experienced in layout, procurement and installation of all types of foundry equipment. Most recent experience having been in connection with sand reclamation plant. Address: Box 454, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT, GENERAL FOREMAN

For grey iron jobbing shop. Practical man on light, medium and heavy work with core room and good cupola practice. Employed, 25 years' executive experience. Address: Box 499, The FOUNDRY, Cleveland 13, Ohio.

Capacity Wanted

FOUNDRY CAPACITY WANTED

Small gray iron castings in large quantities. Steady requirements. Long runs. Address: Box 356, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY CAPACITY WANTED

Need 6000 fine grain gray iron compressor crankcase castings per month for three years starting July. Each weigh 23 lbs., also small pistons, cylinder heads, cylinder sleeves, connecting rods for same machine. Address: Box 475, The FOUNDRY, 16 E. 43rd St., New York 17, N. Y.

Open Capacity

We have open capacity for production work on gray iron and alloy castings from one to six thousand pounds per casting weight. Address: MID-WEST FOUNDRY, 3430 BRIGHTON BLVD., DENVER 5, COLO.

OPEN CAPACITY

Nonferrous jobbing foundry has open capacity for sand cast brass, bronze or aluminum. Made to all usual specifications. Address: Box 476, The FOUNDRY, Cleveland 13, Ohio.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample or prints. Address: C. E. Piersol, 817 Third St., Lancaster, Pa.

FOUNDRY CAPACITY WANTED

ALUMINUM PERMANENT MOLD CASTINGS may help get your product to market earlier; may cut machining and finishing costs and increase tensile strength. If you require quantity production in a hurry, it will pay you to send us your prints or sample today for quotation.

FLORIDA DIE CASTING FOUNDRY
131 W. KALEY AVE. ORLANDO, FLA.
PHONE 5215

Open Capacity

MACHINED
GREY IRON
Castings
Production Runs. All weights
¼ lb. to 100 lbs.

BOX 456
THE FOUNDRY CLEVELAND 13, OHIO

Foundry Work Wanted

Designers and Builders of PERMANENT MOLDS for production castings from kitchen utensils to engines.

WAGNER PERMANENT MOLD CO.
2910 EMPIRE AVE.
BURBANK, CALIF.

Accounts Wanted

GRAY IRON ACCOUNT WANTED

For Metropolitan area of Chicago by well established manufacturer's agents familiar with foundry methods.

BOX 471
THE FOUNDRY CLEVELAND 13, OHIO

Foundries For Sale

FOUNDRY FOR LEASE

Aluminum foundry for lease, approximately 30,000 sq. ft. with 3 acres of land. Heat treating, sand blasting, molding equipment, etc. optional. Address: P. O. Box V, Puente, Calif.

FOR SALE

Modernized production foundry for sale. Located favorably between Chicago and Milwaukee. Labor conditions excellent—production capacity 35 tons a day. Newly equipped during last twelve months. Can be operated as one or two foundry units. Address: Box 458, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED TO LEASE & BUY

Will lease with option to purchase grey iron Foundry 10 to 50 tons capacity in Indiana, Illinois, Michigan or Wisconsin in a town up to fifteen thousand inhabitants.

AIRCRAFT ENGINEERING CO.
20 E. Jackson Blvd.
Chicago, Ill.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

2—No. 432 Osborn jolt, rollover, pattern draw molding machines with swingout table.

FRANK FOUNDRIES CORP.
MOLINE, ILLINOIS

WANTED

1—Ladle, 6000 lbs. capacity, complete with bale and hand wheel operated worm tilting mechanism.

WM. R. THROPP & SONS CO.
TRENTON, N. J.

Classified Advertising

Wanted-To-Buy

WANTED

American Gasoline Sand Cutter same as or similar to Model AA712, size 62". Inside width of wheels, rim to rim 65", outside width 72". Overall width not more than 7' 5", cutting wheel 52". Address: **SANITARY CO. OF AMERICA, LINFIELD, PA.**

WANTED TO BUY

Snap flasks and jackets both wood and metal, used or new. Send complete detailed list with prices. Address: KELLY FOUNDRY & MACHINE CO. P. O. BOX 232, ELKINS, W. VA.

WANTED

Brass foundry with building, molding and melting facilities (preferably part electric) with current production or possibilities of producing 30 tons monthly. Location Cincinnati area but will consider anywhere in Middle West. Address: Box 344, The FOUNDRY, Cleveland 13, Ohio.

SIMPSON MIXER WANTED

8' or 9' Diameter Simpson Intensive Mixer for grinding clay. State size, condition and lowest price.

UNIVERSAL SEWER PIPE CORPORATION
1500 UNION COMMERCE BLDG.
CLEVELAND, OHIO

WANTED

Small Foundry, fully equipped. For small gray iron castings. Give full particulars. Address: Box 357, The FOUNDRY, Cleveland 13, Ohio.

WANTED

1—No. 405 Osborn Roll-Over Jolt Molding Machine.

KAY-BRUNNER STEEL PRODUCTS INC.
999 MERIDIAN AVE.
ALHAMBRA, CALIFORNIA

Employment Service

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

SALARIED POSITIONS
$2,500-$25,000

This thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

Correspondence Course

MIXTURES—MELTING—SEMI-STEEL

Our system in plain foundry terms, 90% applicable to your practice will save you coke, reduce losses and build up human element. Get our report on your cupola, eliminate mysteries, use 10 to 50% steel scrap, depending on section, obtaining a metal more pure, homogeneous, with higher strength. Synopsis free.

MCLAIN'S SYSTEM INC.
236 E. NORTH AVE. MILWAUKEE 12, WIS.

Opportunities

CASTING WORK

Machinery Manufacturer requires Grey Iron Foundry source for miscellaneous casting work.

BOX 352

THE FOUNDRY CLEVELAND 13, OHIO

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION C.P.O. BOX 1501, CLEVELAND, OHIO.

For Sale

FOR SALE

A well-equipped brass and gray iron foundry. Location Northwestern Ohio. Address: Box 468, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

11 sets 14" dia Round Flasks—New Steel—write for particulars. FOREST HILL FOUNDRY CO., 93 TIFFANY BLVD., NEWARK 4, N. J.

FOR SALE

1—Johnston & Jennings No. 610 Portable Rollover, Pattern Draw Moulding Machine. Table 24 x 30, Draw 10". Price $650.00. Address: E. L. LE BARON FOUNDRY CO., BROCKTON 64, MASS.

FOR SALE

Grey Iron Foundry. Good building. Good location. Address: John H. Seeling, 1101 Cunningham, La Crosse, Wis.

FOR SALE

1—No. 403 Osborn Roll-Over Jolt Molding Machine
1—No. 46 Osborn Roll-Over Core and Molding Machine
For further information write to:

KAY-BRUNNER STEEL PRODUCTS INC.
999 MERIDIAN AVE.
ALHAMBRA, CALIFORNIA

FOR SALE

Molding Machine
49 x 16" International Type "F"
Rollover-jolt-pattern draw
used only 6 months

WAYNE FOUNDRY COMPANY
DETROIT 10, MICH.
TEL. LAFAYETTE 8226

REBUILT EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 LAKE ST. KALAMAZOO 21, MICH.

FOR SALE

Immediate Delivery
1—#4 Whiting Cupola
1—45" Buffalo Blower
1—20 HP Motor, 220 Volts—3 phase 60 cycle
1—starter for above
1—600 lb. ladle
1—2000 lb. geared ladle

THE AMERICAN MALLEABLE CASTINGS CO.
MARION, OHIO

For Sale

REBUILT EQUIPMENT IN STOCK
IMMEDIATE SHIPMENT

ELECTRIC MONORAIL HOISTS

(1)—1/2-ton LoHed, 220/3/60-cy.
(1)—1-ton Northern, 220/3/60-cy.
(1)—1-ton, 2-motor, cage or floor operated 230-VDC. Cleveland Tramrail.
(1)—7½-ton, Shepard, 2-motor, cage operated 230-VDC., 40' 0" lift, excellent for monorail yard service.

AIR COMPRESSORS

(1)—10 x 10 Chicago, 250 CFM. @ 125 lbs. with 220/440-VAC Motor.

OVERHEAD ELECTRIC TRAVELING CRANES

	Tons	Make	Span	Current	Remarks
(1)—	8	Toledo	51' 6"	230-VDC.	CG. OP.
(3)—	10	Shaw	58' 0"	230-VDC.	CG. OP.
(1)—	10	Shaw	68' 0"	230-VDC.	CG. OP.
(2)—	10	P & H	80' 0"	230-VDC.	CG. OP.
	(1—10-ton & 1—5-ton trolley on each bridge)				
(2)—	10/5	P & H	80' 0"	230-VDC.	CG. OP.
(1)—	10	Shaw	88' 0"	230-VDC.	CG. OP.
(1)—	15	Alliance	50' 0"	230-VDC.	CG. OP.
(1)—	15	Shaw	106' 8"	230-VDC.	CG. OP.
(1)—	20	Cleveland	50' 0"	230-VDC.	CG. OP.

SPECIAL

(1)—1½-yd. cap. 2-line Lakeside Bucket Handling O.E.T. Crane, 59' 0" span, 220/3/60-cy., practically new, roller bearing throughout, with totally enclosed ball bearing motors. COMPLETELY REBUILT READY FOR IMMEDIATE SHIPMENT.

SPECIAL

(1)—3-ton Chesapeake 3-motor, CG. OP., 220/440-VAC. Gantry Crane, 18' 11" bet. legs, 15' 6" overhang each end. REBUILT.

WE OWN AND HAVE ALL THIS EQUIPMENT IN STOCK. IT IS OFFERED REBUILT IN OUR LARGE MODERN PLANT AND FULLY GUARANTEED.

T. B. MACCABE CO.
4304 CLARISSA ST.
PHILADELPHIA (40) PENNA.

FOR SALE

1—Pangborn, 4-ft. diameter, type LS, Rotoblast table complete with dust collector, lot of spare parts, all motors and controls. Table fitted with four 20" diameter auxiliary tables.
2—Marvel #9 high speed saws, complete with motors and starters—10" x 10" capacity.
1—R-S Products Co. batch type heat treating furnaces, oil fired, complete with all burners, blower, air filter and furnace controls. Heating chamber 5'-6" wide x 7'-6" long. Doors at each end. Hearth above floor.
2—One Allis-Chalmers and one G.E. electric arc furnace transformers, each 1000 KVA, 3 phase, 60 cycles. Primary voltage 13,200. Secondary voltage 160, 150, 140, 130, 120.
1—LeBlond engine lathe 21" x 8'. Double-backed geared, quick change, tool holder, special face plate, no chuck, tools or steady rest. Equipped with Lima individual drive. Complete with motor and starter.
1—Bethlehem abrasive cut-off machine, series 500, chop stroke style, chain drive, complete with motor and starter.
1—Steel City brinell testing machine, type A-4, clearance between upright standards 3'-8". Motor operated crosshead and pump. Maximum height of work suitable 51". Practically brand new.
Lot—Twenty-one (21) high-cycle grinders, 19 either new, factory rebuilt or used, remaining two gearhead missing only. Complete with motor and 32 KW generator for 180 cycle current to supply required current.
1—Berkley centrifugal casting machine, V-belt drive, 24" table, with motor but no starter.
150—Lyon Metal, style B, metal boxes, size 8½" x 17½ x 7½. Brand new, never used.
2—Dings #1958-B magnetic pulleys, 12" diameter x 26" face, complete with shaft and one pair of pillow blocks.

All items listed are in excellent working condition. Current for all drive motors 220 V, 3 phase, 60 cycles. May be inspected. Subject to prior sale. If interested in any or all items, please write to:

BOX 492
THE FOUNDRY CLEVELAND 13, OHIO

Classified Advertising

For Sale

SURPLUS AND USED FOUNDRY EQUIPMENT

Just a word to remind you that we BUY as well as sell used foundry equipment. For fast action in turning equipment into cash, take advantage of our many years of contact with the foundry industry.

We will inspect surplus equipment for you anywhere in the country, report its condition, specifications, etc. for a moderate fee.

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CORP.
NEW ADDRESS—77 WEST WASHINGTON ST. PHONE—STATE 5346
CHICAGO 2, ILLINOIS

OVERHEAD CRANES

½-ton "American" 17′ Span
1-Ton Curtis 24′ Span
1½-Ton P&H 28′ & 34′ Span
2-Ton "Detroit" 28′ Span
2-Ton Shephard Niles 18′ Span
3-Ton Euclid 38′8¾″ Span
5-Ton Shephard Niles 40′ Span
5-Ton Shaw 82′ Span
5-Ton "American" 70′ Span
5-Ton American 47′5″ Span
5-Ton Manning Maxwell Moore 31′ Span
5-Ton Case Gilbert 44′9¾″ Span
5-Ton P&H 44′9¾″ Span
5-Ton Champion 44′9¾″ Span
5-Ton Bedford 34′ Span
6-Ton P&H 78′ Span
6-7-Ton Milwaukee 70′ Span
6-Ton "American" 77′ Span
7½-Ton P&H 30′6″ Span
7½-Ton Lakeside 100′ Span
7½-Ton Bucyrus-Erie 70′ Span
10-Ton P&H 60′ Span
10-Ton Milwaukee 58′9″ Span
10-Ton Morgan 39′5″ Span
10-Ton Alliance 58′9″ Span
10-Ton Erie 80′ Span
10-Ton Emsco 80′ Span
10-Ton P&H 78′ Span
10-Ton Bedford 78′ Span
10-Ton "American" 27′ Span
15-Ton Whiting 57′3″ Span
15-Ton Leonard-Burke 74′9″ Span
15-Ton Shaw 77′ Span
15-Ton Shaw 82′ Span
15-Ton Whiting 74′8″ Span
15-Ton Niles 32′ Span
15-Ton Chesapeake 55′6″ Span
15-Ton Alliance 35′ Span
15-Ton Northern 53′ Span
20-Ton Alliance 77′ Span
20-Ton P&H 51′4″ Span
20-Ton Shephard Niles 44′9″ Span
20-Ton P&H 50′ Span
20-Ton Whiting 80′ Span
20-Ton P&H 51′4″ Span
25-Ton P&H 74′8″ Span
25-Ton Leonard Burke 74′8″ Span
25-Ton Whiting 82′ Span
25-Ton Niles 46′ Span
25-Ton Shaw 70′ Span
25-Ton Cleveland 106′ Span
30-Ton Morgan 30′ Span
30-Ton Niles 53′9″ Span
30-Ton Whiting 60′ Span
35-Ton Northern 22′ Span
35-Ton Alliance 90′ Span
75-Ton Alliance 37′ Span
80-Ton "American" 40′6″ Span
150-Ton Whiting
200-Ton Alliance 100′ Span

Take advantage of the ECONOMY service by telephoning to us collect, which will enable us to discuss your requirements and present our suggestions.

In addition to overhead cranes we can supply all types of shovels, cranes, draglines, tractors or practically everything in the equipment field. May we have your inquiries?

ECONOMY CO., INC.
49 VANDERBILT AVENUE, NEW YORK 17, N. Y.
Telephones: MUrrayhill 4-2294, 4-2893, 4-2295, 4-2844, 4-2296, 4-8292

FOR SALE

Pangborn Sandblast Cleaning Table Model LD 1 8 feet. In good condition—exceptionally clean. May be inspected—can load immediately.

CAST METALS CORPORATION
DESHLER, OHIO
PHONE 206

EQUIPMENT FOR SALE

One Beardsley and Piper sandslinger, stationary type, self contained unit, in good condition. Address: J. O. STEPHENSON FOUNDRY MFG. CO., 420 EAST CADY, NORTHVILLE, MICH. PHONE: NORTHVILLE 888.

FOR SALE

One No. 7½ Roots low pressure foundry type blower; overhung pulley, top discharge in good running condition. Address: Box 494, The FOUNDRY, Cleveland 13, Ohio.

REBUILT

BLOWERS—FANS—EXHAUSTERS

Centrifugal blowers for gas and oil burning Sand blast, grinders and dust exhausters Roots-Connersville positive cupola blowers Welding fume exhausters—Ventilating fans.

GENERAL BLOWER CO.
8601 FERRIS AVE.
MORTON GROVE, ILL.

For Sale

REBUILT EQUIPMENT IN STOCK

Molding Machines
2—International Type F 24″ x 10″ Stationary Power Jolt, Rollover, and 10″ draw.
2—International Type F 26″ x 12″ Stationary Power Jolt, Rollover, and 10″ draw.
2—International Type M 24″ x 10″ Portable Power Jolt, Hand Rollover and Draw.
1—Osborn No. 450 Stationary Jolt Stripper.
1—Tabor 30″ x 40″ Table Size Portable Jolt with adjustable Stripping pins.
1—Osborn No. 405 Stationary Jolt Rollover with 9″ draw cyls.
1—Pridmore Type V Style AV Jolt Rollover Draw 48″ x 74″ Table 4000 lbs. capacity.
4—Arcade Modern No. 2-38 Portable or Stationary Hand operated Squeeze Rollover Draw with swing out table.
5—Mumford 3″ cyl. Core Jolt with 20″ x 15″ table.
Several plain air squeezers.
Metal Melting Equipment
1—Whiting Style Cupola 41″ dia. shell.
New 32″ to 41″ dia. shell cupolas made to order.
1—Monarch Tilting Iron Pot Aluminum Furnace 100 lbs. cap. Gas or Oil.
2—Hausfeld Tilting Crucible Aluminum Furnaces 33″ dia. shell. Gas or Oil.
2—Hausfeld Open Flame Tilting Brass Furnaces 400 lbs. cap. Gas or Oil.
2—Monarch-Rockwell Rotating 500 lbs. brass. Oil.
Blowers for Cupolas and Furnaces
1—4.8 Cu. Ft. per rev. Rotary Blower.
1—6.0 Cu. Ft. per rev. Rotary Blower.
1—19 Cu. Ft. per rev. Rotary Blower.
Maxon-Premix Blower Sets for Gas ⅛ to 1 H.P. Motor Driven Centrifugal blowers to 2 lbs. press.
Belt Driven Centrifugal blowers for Cupolas.
Tumbling Mills and Sand Blast
1—McLeod 36″ x 36″ Sand Blast Barrel with Suction sand feed.
1—McLeod 36″ x 36″ Sand Blast Barrel with bucket sand elevator to press, generating tank.
1—McLeod Sand Blast Generating Tank.
1—McLeod Cloth Screen Dust Collector.
1—Swartwout Car Type Core Oven with Insulated Steel walls, 6½′ x 7′ x 11′ inside dimen. 5′ x 6½′ Door. Gas Fired. One Car Included.
1—4000 lbs. cap. Worm Geared Crane Ladle.
Air Compressors 1 to 60 H.P.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

3 Ton Northern Overhead Crane, rail width 22′; 2 Ton Box Overhead Crane, # 842, rail width 45′-7″, both cab type, complete with DC motors, controls and tracks.

ABBOTT SALVAGE COMPANY
1087 CLINTON ST. BUFFALO 6, N. Y.

CENTRIFUGAL COMPRESSORS AND BLOWERS

2100 CFM GE with 10 HP 3/60/3450 RPM motor.

1200 CFM Buffalo, 9½ x 7 x 7¼ with 7½ HP, 220/3/60 1750 motor.

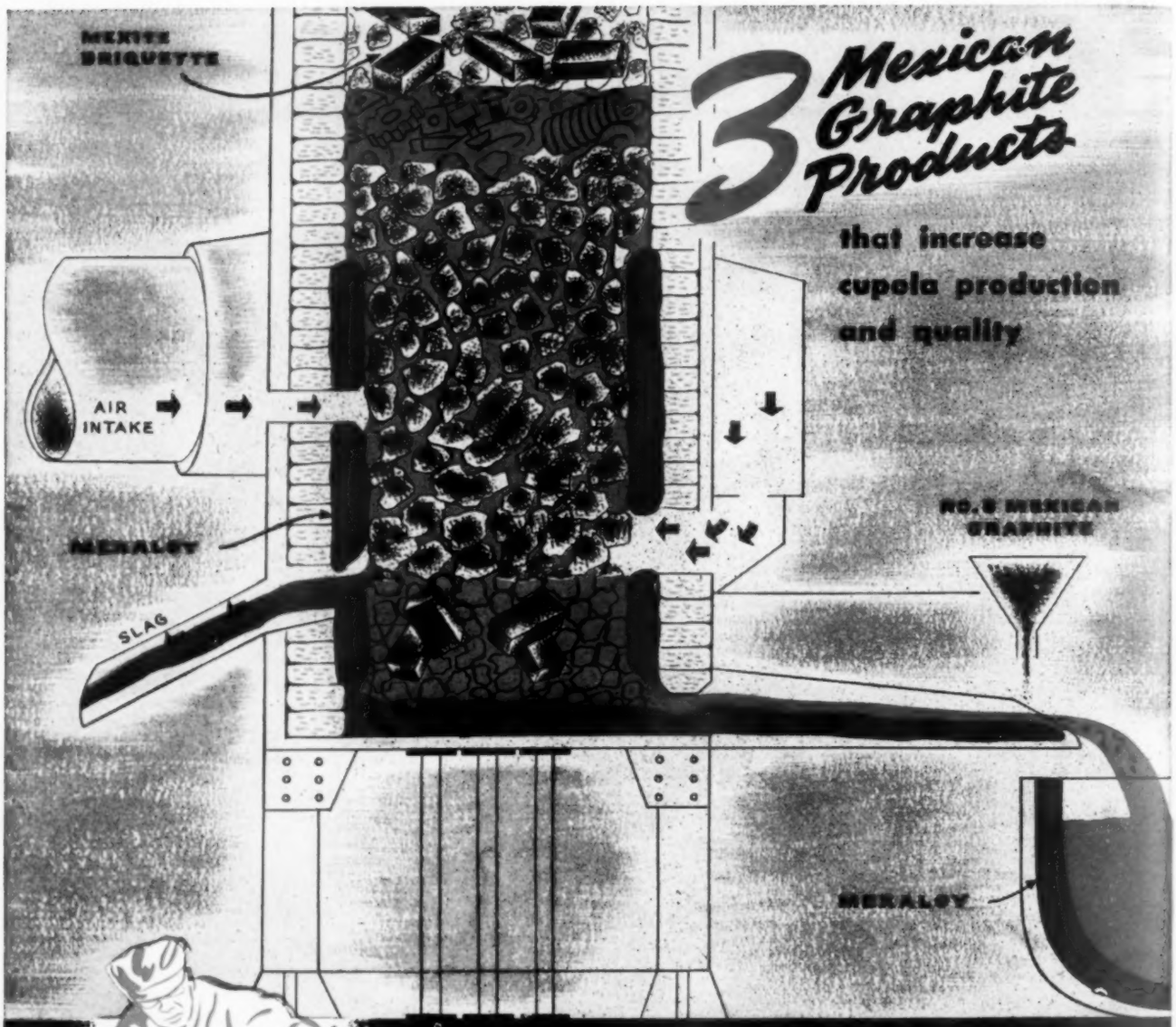
20¼ x 16¼ x 18¼ Allington and Curtis No. 55 (belt drive).

10½ x 10½ American size 5, belt drive.
9 x 9 Buffalo size 4, belt drive.

(2) 8 x 8 Sturtevant size 21061-9 (belt drive).
6 x 6 North American No. 17 with 15 HP 220/3/60 3500 RPM.

150 CFM @ 502, North American 19″ dia. with ¾ HP 3/60/220/440 volt 3500 RPM.

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE. CLEVELAND, OHIO



3 Mexican Graphite Products

that increase cupola production and quality

MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also reduce the range of carbon content fluctuation and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is easily applied to any clean surface. Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

NO. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, producing castings of increased machineability. Normally only 2 lbs. of No. 8 need be added per ton of molten metal—a cost of only ten cents per ton—to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

THE UNITED STATES GRAPHITE CO. • SAGINAW, MICHIGAN

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Use Par-Blast
CLEANING ROOMS
FOR
Low Cost Blast Cleaning

Par-Blast Equipment Is Used by the Leaders in Industry

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American Brake Shoe & Foundry Co.
Cadillac Motor Car Co.
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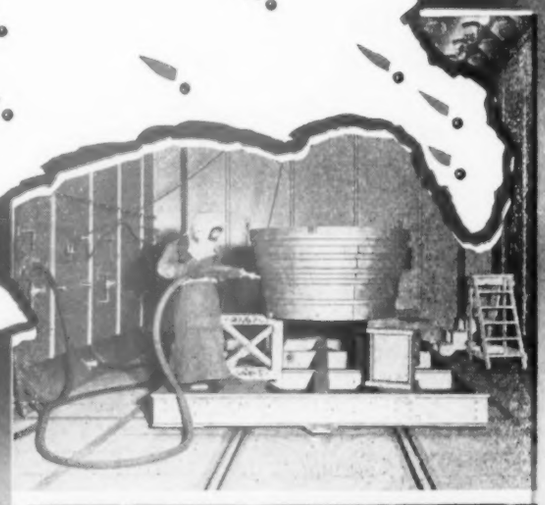
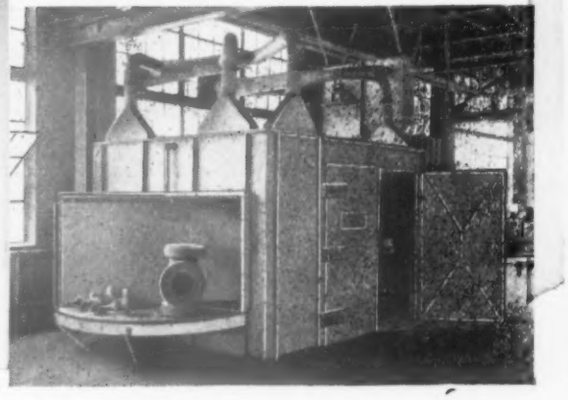




PAR-BLAST *Cleaning Equipment is backed by over 25 years of creative engineering experience plus practical experience gained from installations throughout the country*

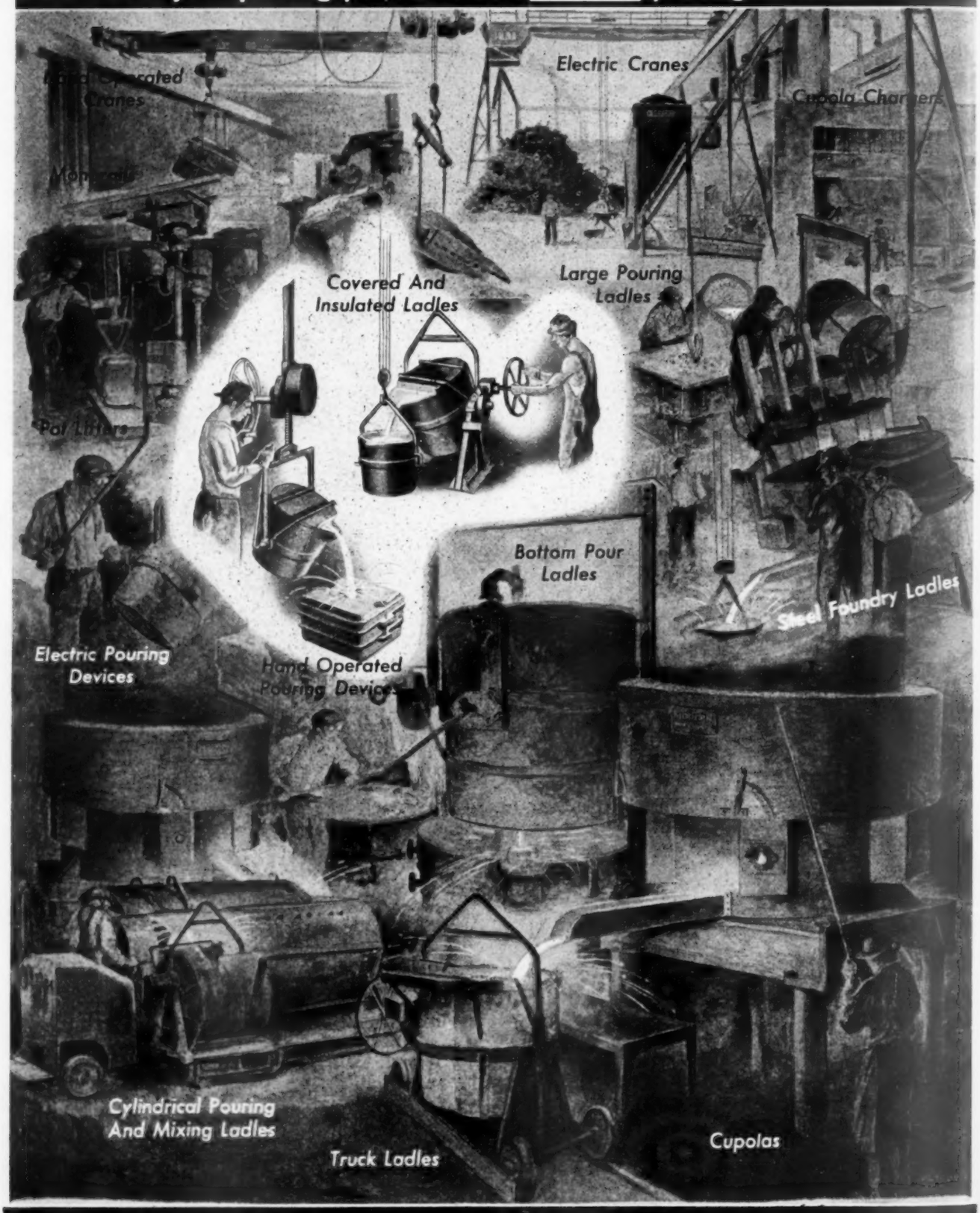
Leaders in the industry use Par-Blast rooms for shot, grit and sandblast cleaning because they do the job quickly . . . efficiently . . . and at a lower cost. Par-Blast rooms are custom designed to handle the specific work or pieces to be cleaned. Turntable, Car and Monorail models are equipped with effective blast tanks . . . efficient abrasive reclaiming units . . . downdraft ventilation and adequate illumination. Walls are heavy steel plate, reinforced and braced for strength and rigidity. Doors are self-closing and self-sealing. Let us analyze and recommend the best type equipment for your plant . . . there's no obligation . . . write today, or send for bulletin No. R-41.

CREATIVE ENGINEERS MANUFACTURERS

Parsons **ENGINEERING CORP.**

2545 EAST 79th ST. CLEVELAND 4, OHIO

Solve your pouring problems with MODERN pouring devices & ladles



Cupolas • Cupola Chargers • Lifetime Geared Ladles • Ladles • Electric Cranes
Metal Pouring Systems • Covered & Insulated Ladles • Improved Bottom Pour
Furnace Charging Cranes • Crane & Monorail Systems

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.
DEPT. 184

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EVER GIVE IT A THOUGHT?

CORE WASHES for GRAY IRON ALUMINUM BRONZE BRASS STEEL

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We manufacture or handle

"Everything for a Foundry"

Whether your order calls for a foundry facing, a hundred chaplets, ladle bowl or liner, or a Beardsley & Piper Sandslinger, when sent to Stevens it is handled by men who know their business and YOURS. The Stevens Sales and Service Departments are ready to serve you at all times.

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FREDERIC B. STEVENS INCORPORATED

DETROIT 26 MICHIGAN

NEW ENGLAND . 166-182 Brewery St., New Haven, Conn.
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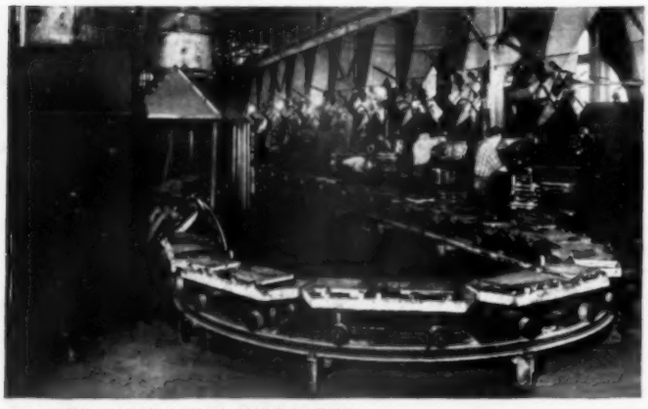
INDIANA . Hoosier Supply Co., 36 Shelby St., Indianapolis, Ind.

• CANADA . FREDERIC B. STEVENS OF CANADA, LIMITED
• 1262 McDougall St. . . . . Windsor, Ontario
• 2368 Dundas St., West . . . . . Toronto, Ontario

FOUNDRY Materials Handled at Lowest Cost with LINK-BELT CONVEYORS

OVERHEAD
The Link-Belt overhead trolley conveyor has unlimited possibilities in handling castings, cores, and in many cases, the mold. Supported from overhead, it saves floor space, is flexible in arrangement, efficient and smooth in operation. It travels irregular paths — is simple, inexpensive and easily installed around existing equipment.



AUTOMATIC MOLD DISCHARGE. The Link-Belt Tru-Trac car type mold conveyor is designed for handling both large and small snap flask molds and to operate in irregular paths — up and down inclines. It has heavy cast-iron car tops, is fully equipped with anti-friction bearings and is low in both maintenance and H.P. requirements. The unit illustrated above, automatically discharges the molds.

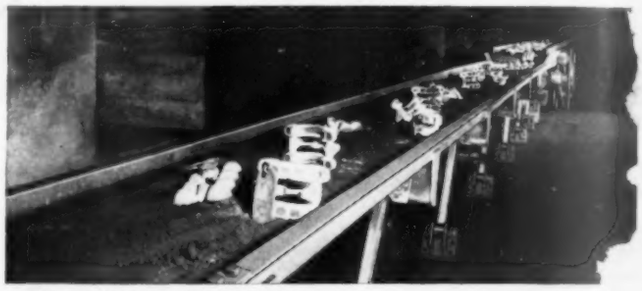
POURING ON INGOT CONVEYOR. Hand lifting and carrying of ladles is eliminated by this Link-Belt conveyor which carries the molds through the pouring and cooling operations and discharges the ingots over head end of conveyor. Made in various designs and capacities to produce practically any size ingot.

10,128

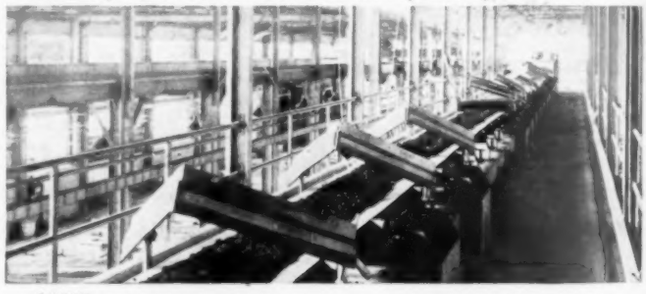
● The transportation of materials within your foundry offers a real opportunity to lower costs. If you are still using arm and leg muscles where you should use conveyors . . . if you are still piling unskilled labor on top of product costs . . . if you still operate without the benefit of mechanical continuous-flow of materials throughout your foundry, what a revelation you will have when you sit down and talk it over with a Link-Belt materials handling and sand preparation engineer. Link-Belt makes all types of conveyors. Call our nearest office.

LINK-BELT COMPANY

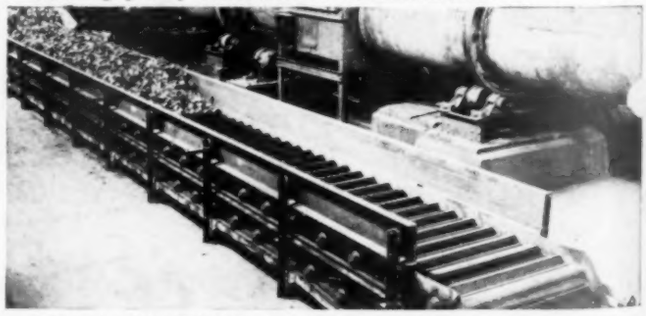
Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.



HOT SAND and CASTINGS are handled simultaneously on this Link-Belt Oscillating-Trough conveyor which cannot burn out or injure its steel trough. Greatly reduced maintenance — no spillage — no return-run required — no "joints" to be attacked by abrasion. Link-Belt engineers have accumulated a wealth of experience on this type of conveyor which is available to the foundry industry.



SAND. Link-Belt distributing belt conveyors with single or double adjustable discharge scraper plows, deliver prepared sand to any number of molding stations in proper quantities. Molder's hoppers, gates and chutes are adaptable to different types of molding machines, and building clearances. Link-Belt anti-friction belt conveyors, including both flat and troughing types, are for every service in the foundry, including specially treated belts for hot shakeout sand.



APRON CONVEYORS. Years of trouble-free service under the rigors of high temperatures and abrasive action have proved the durability and efficiency of Link-Belt apron conveyors for handling castings and sand. "No-leak" type apron conveyors prevent leakage of sand by means of an apron designed and built especially for foundry service. Made in various sizes and pitches to suit individual conditions.

THE SYMBOL OF QUALITY · LINK-BELT · LB

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT